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VOL. LXXI.]

JANUARY, 1938.

18-3-38

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LIBRARY

ARCTIC BUTTERFLIES, AND ESPECIALLY THOSE OF MAALSELVEN, LAPLAND, LAT. 69° N.

BY P. HAIG THOMAS.

THE difficulties encountered by previous collectors in the Arctic are well known, and owing to the abnormal weather the season of 1937 was no exception in this respect. There was an unusually heavy snowfall in Lapland during the winter, followed by very hot weather in late April and early May. The second half of May and the first half of June were cold and wet, but between June 12th and 15th and from the 19th to 23rd the weather was exceedingly hot, the temperature being over 80° F. in the shade every day, and on the 23rd reaching 94°. The rest of the month there was very little sun, some rain, and a great deal of wind. In fact there were only two windless sunny days during the whole of our visit. July was cloudless throughout except for one day's rain on the 12th.

Accompanied by my daughter I arrived at Rundhaug in Maalselven on June 10th. Here we remained till July 29th, except for a week on the shores of the Tornetrask between July 7th and 16th. The hotel at Rundhaug is extremely comfortable, and Herr and Frau Sandmo and their family did everything possible to make our visit a pleasant one.

For the first few days we collected on the bogs three or four miles below Rundhaug and about 140 ft. above sea-level, when we found butterflies locally very common, especially on the drier parts, where *Betula nana* and *Rubus Chamaemorus* (the Cloudberry) grew. Everywhere we found the grassy parts of the bogs, where dwarf sallow grew, to be quite unproductive. Subsequently most of our collecting was done on Omas Varra, a fjeld 1800 ft. high, above Tak Vatn. This fjeld is the watershed between Maalselven and the Balsfjord.

The only naturalist who has previously visited Maalselven to collect Lepidoptera is the late Prof. Sparre Schneider; he collected for many seasons in Maalselven between 1877-1912. *Maalselvens Insektfauna* has been published by Herr Johan Rygge of Oslo, who very kindly sent me a copy. Unfortunately I did not receive it till the season was nearly over, and was unable to make use of the valuable information which it contains.

The following species were met with :

Papilio machaon.—Occurs spasmodically all over Northern Scandinavia. I saw three by the roadside on my way to Omas Varra and captured a fine fresh female on 23. vi.

Pieris brassicae.—Common round Rundhaug 2–18.vii.

Pieris napi adalwinda.—Common and well out at Rundhaug 12. vi–18.vii. It does not appear to differ from *P. napi bryoniae*.

Colias palaeno lapponica found singly everywhere, first taken 22. vi; though it was still flying in the middle of July, it was worn by the end of June.

C. nastes werdandi.—Not common in the Maalselven Watershed. I found it from 200 ft. above sea-level to 3500 ft. It was most abundant between 1200–2000 ft. The males were already worn on 19.vi, and it was over in Maalselven by the end of the month. Still fresh at 2500 ft. by the Tornetrask on 8.vii, and I took a perfectly fresh female at 3500 ft. on 15.vii.

C. hecla sulitelma.—Much commoner than *werdandi* and later in emergence. Males just out, 19.vi, females 1.vii. The latter had a great range of variation.

Erebia lappona.—Everywhere above the tree line up to 4000 ft.; very common on Omas Varra 19.vi, and still flying at 4000 ft. above Tornetrask 15.vii.

E. ligea.—Common all along the Maalselven from 29.vi. It was, however, worn by 6.vii.

Oeneis norna.—Common on Omas Varra in sheltered hollows immediately above the tree line 19.vi; males only. Both sexes abundant on 21.vi, worn 23.vi. It appeared later up to 1800 ft. in hollows, but was not common.

Vanessa urticae polaris.—Common in Maalselven in second half of July.

V. antiopa.—Not seen in Maalselven, but observed fresh in Swedish Lapland near Gallivare 30.vii.

Melitaea iduna.—I took a male on Omas Varra on 21.vi and a fine series of males and one female on 23. vi in hollows 1400–1600 ft. above sea-level. Two more females and a few more males were taken at the beginning of July, but they were becoming worn. This insect, which loves to bask in the sun, has a very rapid flight, but is easy to capture, as it seems always to return in a few minutes to the place from which it was disturbed. Herr Sparre Schneider appears not to have taken it in Maalselven.

Brenthis aphirape.—Both *aphirape* and its var. *ossianus* were taken 12.vi. It was very common on the bogs 15.vi, and worn 19.vi. Very little later at 700 ft., where it was worn on 23.vi.

B. selene.—Exceedingly common everywhere up to 800 ft. and even higher during the second half of June and early July. In

Maalselven *selene* does not differ from the ordinary mountain forms of Central Europe. I took only one approaching the fine race *hela*, found in Northern Finland.

B. euphrosyne and var. *finjal*.—12.vi–6.vii flying with *selene* but not quite so common. Most of my specimens were typical *euphrosyne* on the upperside; three males and two females are, however, as dark as those from Gavarnie in the Pyrenees. All of them have the ground-colour of the underside of the wings a pale buff instead of red.

B. pales lapponica.—Common on all the high ground we visited after the first week in July. First seen 5.vii on Omas Varra.

B. arsilache.—First taken on Omas Varra 29.vi. Common later on bogs and damp places below, as well as above the tree line.

B. freija.—Common and well out on bogs below Rundhaug 12.vi. Many males worn; by the 18th it had entirely disappeared, though a few fresh specimens appeared on Omas Varra up till 2.vii. Here I saw a female ovipositing on a dry stony ridge covered with dwarf crowberry (*Empetrum nigrum*). She settled on the twigs, but each time the egg fell on to the ground, no attempt being made to attach it to the twig or leaves.

B. polaris.—I found this insect not uncommon on a restricted area on the N.W. side of Omas Varra and close to the summit on 22.vi. It was well out in both sexes, some males already worn. A few more fresh specimens appeared during the next few days, but by the beginning of July it was hopelessly worn and scarce. The insect flies low, and where the ground is not too rough is easy to catch. Its habitat was a dry stony ridge with scattered grass and, of course, *Dryas octopetala*.

B. frigga.—A few males on bog below Rundhaug 13.vi. 14, 15.vi very common, a few females emerging. 18.vi males worn, females abundant, 22.vi both sexes worn and only a few flying. Both sexes were out on Omas Varra 19.vi, but were scarce.

B. improba improbula.—Herr Schneider first discovered this insect on a fjeld close to Alte Vand, from which a large tributary flows into the Maalselven. I had intended to search for it in this locality in the third week in July, Herr Schneider's date being 18.vii.93, when he took two pairs quite fresh. However, I found it not common, but distributed over a large area of ground between 3300–4000 ft., on fjelds up a valley which debouches into the Tornetrask. I took four on 8.vii. Dr. and Mrs. Higgins arrived the same evening and between the 9th–15th we both got a fair series, though the majority of the insects caught were worn. The emergence this year must have begun at the end of June. The insect inhabits dry and stony slopes amongst patches of permanent snow and usually where *Carex rigida* grows. Its flight

period each day is very short, even if the weather conditions remain suitable. It only flies in the hottest sun, and not at all if there is much wind. I obtained nearly the whole of my series by walking them up. In character and general appearance *improbula* resembles a dark *Melitaea asteria*.

B. thore scandinavica.—Not uncommon by roadside at the foot of Omas Varra 700–1000 ft. More plentiful at the head of the Kirkesdal Valley.

Lycaena hippothoë stieberi.—Common round Rundhaug and later up to 1500 ft. also by the Tornetrask 29.vi–15.vii.

L. helle.—We took a few fresh and worn specimens at Rundhaug at the end of June. Herr Schneider does not mention it in his list of butterflies from Maalselven.

L. phlaeas hypophlaeas.—22.vi–18.vii, common in Maalselven ; a few taken by the Tornetrask.

Lycaeides argyrognomon lapponica.—Locally common in Maalselven 29.vi–6.vii.

Vacciniina optilete cyparissus.—Common and widely distributed from 22.vi–18.vii.

Agriades orbitulus aquilina.—I only saw one specimen of this insect on the *B. polaris* ground on Omas Varra 29.vi. It was blown over a cliff before I could net it. Herr Schneider took it near the top of several fjelds, but never found it common.

Aricia astrarche.—26.vi–18.vii, common in Maalselven. The race approaches *alpina*.

Polyommatus icarus.—Not rare in Maalselven from the end of June to the middle of July. A large race. Of the seven females taken, all are heavily marked with blue, but only one shows faint inner marginal red spots on the upperside of the wings.

Pyrgus andromedae.—Not uncommon on Omas Varra from above the tree line to the top 19.vi–6.vii.

The following insects have been obtained by Herr Schneider in Maalselven, but were not found by me :

Melitaea athalia polaris.—This is represented in his collection by 4 males and 2 females taken on Frihedsli 10.vii.95. This butterfly is common near Salmijarvi in Northern Finland.

Hesperia comma.—Taken on the same date and locality as *M. athalia polaris* and very worn.

The following Arctic butterflies do not appear to have been taken in Maalselven :

Erebia polaris.—Its present known habitat is from the Tana to the Alten. This year it was common but quite over when found by Dr. and Mrs. Higgins on the shores of the Porsanger Fjord at the end of June.

Erebia disa.—We hunted many bogs unsuccessfully for it. It occurs on the Alten and throughout N. Finland and near the Tornetrask.

Brenthis chariclea.—Has been taken near the Balsfjord at Skelpejarvie and by the Tornetrask. These places are respectively N., N.E. and S. of Maalselven and adjacent to it, so there is no reason why it should not occur in Maalselven itself. Dr. and Mrs. Higgins took it worn at the end of June and beginning of July by the Porsanger Fjord. Mr. and Mrs. Cox took it worn in N. Finland at the end of June. It is quite definitely a mountain insect and flies between 800–1500 ft. A Finnish date for emergence is 22. vi, a day or so before *B. polaris*.

Oeneis bore.—Only enters Norway on the southern shores of the Sud Varanger Fjord. It occurs on several mountains inland in Northern Finland, but is not known to occur in Swedish Lapland.

Pyrgus centaureae.—I expected to see this common butterfly in Maalselven. It appears also to be absent from Saltdalen.

The Grange,
Goring, Oxon.

MAYFLIES.—In the *Salmon and Trout Magazine* for September, 1937, Mr. Martin E. Mosely discusses at some length, and with much erudition, the application of the word "Mayfly". He shows us that in 1614 the word was used by a noted fisherman for an *Ephemera* and for a Stonefly, who distinguished between the Stonefly "which some call the Mayfly" and the *Ephemera*. Having thus stated a case such as would suffice (!), if submitted to the International Commission on Zoological Nomenclature, to establish the claim of *Ephemera* to be called the Mayfly (although this is, of course, all pre-Linnean !) he then proceeds to demonstrate the frailty of mankind by showing how, subsequently, other authors misapplied the name in most outrageous fashion, even to the extent of disguising "*Libella*" as a Mayfly. The very depth of nomenclatural turpitude is reached in the classic work of Kirby and Spence, who refer to the imaginal "Mayflies (though this last denomination properly belongs to the *Sialis lutaria* which generally appears in this month)". "Improperly" would be the better description, for here is a deliberate and unprovoked perversion of this delightful name. The rot, however, did not affect entomologists alone; Mr. Mosely freely admits that fishermen now do not know *which* insect they mean by "the Mayfly". There we have the advantage, for entomologists emphatically do know what their Mayfly is, even if it does embrace a whole genus ! No, Mr. Mosely; as a fisherman you may beseech us to deliver up to you your (indeterminate) Mayfly; but as an entomologist you know full well that the whole Order of Mayflies (correctly determined!) will be true to their name, and you will have to "take" them sooner or later, for better, for worse. There is much pleasure in the pursuit of the inconsequent.—N. D. RILEY.

FURTHER RECORDS OF INSECT MIGRATION IN THE ARGENTINE REPUBLIC.

BY KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

SINCE the publication of my last notes on insect migratory movement in the Argentine, I have unfortunately been able to accumulate very little further information, and although I have been in a position to note immediately any such movements that might take place in my neighbourhood, with the exception of the flight of dragonflies mentioned below, no such movements appear to have occurred.

During November of 1930 there appears to have been a considerable southerly movement of *Vanessa carye* (Hübner). On looking over some old correspondence I find that this movement was reported to me as having been noted by Dr. E. D. Dallas in the city of Buenos Aires and by Dr. Carlos Bruch in the northern suburb of Olivos during the opening days of the month, whilst my friends Alberto Breyer, Pablo Köhler and Ricardo Strassberger found evidence of this flight at Punta Lara near La Plata on the first of the month whilst collecting there. That the movement was extensive and general is proved by a letter forwarded me at the time by Dr. Dallas from a correspondent in Necochea, a watering-place some 300 miles south of Buenos Aires. Dr. R. Faggiolo, under date November 3rd, wrote to Dr. Dallas as follows (translated): "Yesterday I sent you the wing of one of the butterflies . . . that I mentioned as migrating toward the southern regions. The large lily plants in my garden were the other day literally covered with these butterflies that came from the north, and on the flowers of these lilies they satisfied their hunger after their long journey. In the afternoon they continued their flight. . . ." I received and identified the wing as that of *Vanessa carye*.

The movement of dragonflies mentioned above, and which came under my immediate notice, took place at Concordia (Entre Rios) on the 18th and morning of the 19th of March, 1936. The species concerned were the Aeshnid *Anax amazili* Burmeister and *Tramea cophysa* (Selys), for the determination of which I have to thank my friend, Lt.-Col. Fraser. This was an east to west migration, and enormous numbers of insects passed whilst the flight lasted. Those that arrived in the locality at dusk on the 18th, stayed overnight, and it was a curious sensation to walk amongst the bushes as darkness fell, as at every step hundreds of dragonflies rose and circled round. The insects that remained overnight fed early in the morning and then continued their westerly movement and by midday the number of dragonflies present was again quite normal.

The atmospheric conditions during the day preceding the arrival of these insects and those of the 18th and 19th were as follows: Maximum temperature, 86·5, 103·1 and 102·6° F. respectively; minimum temperatures, 68·0, 70·9 and 77·7° F.; relative humidity (mean), 77%, 50% and 52%; barometer, 756·0, 755·6 and 756·7 (without appreciable variation during the respective 24-hour periods); wind, on the 17th, fresh S.E., on the 18th, fresh N.E., veering to N.N.W. (light breeze) at about 6 in the afternoon, and on the 19th, a light southerly breeze changing to N. at midday and back to S.E. in the evening. Rain commenced to fall during the afternoon of the 20th, accompanied by a strong S.E. wind, and continued at intervals accompanied by easterly or south-easterly winds until midday on the 25th, the barometer not showing appreciable change. After this period of wet weather the temperature dropped considerably, normal autumn temperatures taking the place of the higher summer temperatures experienced up till this date.

The Experiment Station,
Concordia,
Argentina

ARGYROPOLOCE METALLICANA (HÜBN.) IN THE ENGLISH LAKE DISTRICT. —A young friend of mine, Mr. Alec Hayward, of Wallington, Surrey, visited the Langdales on June 23rd, 1936, and he kindly gave me on his return three moths, alive. He said he had boxed them at about 2300 ft. Two of them were *Argyroplote palustrana* (Zell.), and the other was a fine perfect example of *A. metallicana* (Hübner.) (= *alternana* (Wilk.)). The only localities for this species are stated by Mr. Meyrick in his revised handbook as Perth to Aberdeen, local. Barrett mentions the Scotch localities, but states that he knows of no records for England, Wales or Ireland. Mr. Meyrick has seen the moth, and I have to thank him for confirming the record. —ALBERT E. WRIGHT; Brunleigh, Grange-over-Sands, December 8th, 1937.

ABUNDANCE OF *COLIAS CROCEUS* IN THE REGION OF ROYAN-PONTAILLAC (CHARENTE INFÉRIEURE, FRANCE). —The appearance of a very large number of *Colias croceus* at the end of September in 1937 took place again as in previous years. A single day's collecting there produced 300 females of the f. *helice*, together with a very remarkable series of varied coloration establishing transitions to the var. *aubuissoni* through the more or less marked invasion of the yellow. It is to be noted that every region produces its own special forms. At Royan one only meets very exceptionally with female *croceus* showing any analogy to the var. *helicina*. The September emergence of 1937 seems to have produced specimens on the whole slightly smaller than those of 1936. Temperature having been favourable, one was still able to see *Colias* flying in November along the Atlantic coast. —RENÉ OBERTHUR; Rennes.

QUANTITATIVE METHODS OF LOCAL ENTOMOFAUNISTIC SURVEY.

By J. COWLEY, M.A., F.R.E.S.

IN 1926 K. J. Valle published an important paper (1926*a*, see list of references), the title of which may be translated as "On the Improvement of our Entomofaunistic Researches". The scheme put forward in Valle's paper (summarized in German in Valle, 1926*b*) has been adopted by Odonatists in Finland, but appears to have been overlooked elsewhere—which, perhaps, is not surprising, as the first paper is entirely in Finnish, and the second is only of interest to Odonatists. It is the purpose of these notes to draw attention to Valle's excellent scheme, and to indicate some more recent and more detailed quantitative methods of survey.

Valle (1926*a*), remarking on the progress of entomofaunistic research in Finland, deplors that entomologists have been content to record the localities of species with or without the addition of such vague indications as "scarce" or "abundant". He therefore suggests that a standard set of terms should be adopted by all observers and recorders, and suggests the following scheme:

A. Local Faunistic Scale of Frequency (Area of Observation 10 km. square).

Rarissime (rr)—Very rare; only once noted in the area of observation over a period of several years.

Raro (r)—Rare; a single locality in the area of observation where the species appears regularly every year.

Satis raro (st r)—Fairly rare; about 3-4 localities observed where the species occurs.

Passim (p)—Occasional; about 5-7 localities in the area of observation.

Satis frequenter (st fq)—Fairly common; about 8-10 localities observed.

Frequenter (fq)—Common; more than 10 localities in the area of observation.

Frequentissime (fqf)—Very common; found all over the area of observation.

B. Local Faunistic Scale of Abundance (Area of Observation 50-100 metres square).

Parrissime (pcc)—Very few; a single specimen in the area of observation.

Parce (pc)—Few; about 3-4 specimens in the area of observation.

Satis parce (st pc)—Rather few; about 5-7 specimens in the area of observation.

Sparsim (sp)—Occasional ; about 8–10 specimens in the area of observation.

Satis copiose (st cp)—Fairly abundant ; about 10–20 specimens.

Copiose (cp)—Abundant ; 20–50 specimens.

Copiosissime (cpp)—Very abundant ; over 50 specimens in the area of observation.

If the area of observation is larger or smaller than that given in the scale, the numbers of localities or specimens observed for each grade should be increased or decreased in proportion. If there is uncertainty as to which one of two grades of the scale should be recorded, note both : *e.g. raro-satis raro (r-st r)*.

We might usefully adopt Valle's scales, retaining the Latin terms, which may be recorded by their abbreviations. Note that 10 km. square is about 6 miles square, and 50–100 metres square is about 55–110 yards square. It may not always be easy to count or estimate the numbers of specimens according to Scale B, and species of widely differing sizes may on that account be wrongly estimated, but it is certainly a very convenient method for the field—admittedly only a first approximation to the local populations ; it may be rendered more exactly quantitative by capturing, marking and then releasing as many specimens in the locality as possible. The following methods of marking have been described recently :

Borror (1934) placed, by means of a small pointed stick, dots of Indian ink on the ventral surfaces of the wings of Odonata. The dots were placed at one or more of four different positions on the wing, and the number of dots placed in each position made a four-figure number by which the insect marked could be identified. He further prefixed the initials of right and left, forewing and hindwing, to each such number, according to which wing received the marking. He experienced little difficulty in applying the ink to the wings, the insects were in no way injured or inconvenienced by the treatment, and could be released immediately after marking : individuals recaptured as long as 24 days after marking could still be identified. This method could be extended to other insects with hyaline wings of sufficient size.

Swynnerton (1936) describes methods of marking Diptera and Orthoptera on the thorax with coloured paint, or butterflies on the underside of the hindwings, after removing the scales from a small patch. His methods have been employed extensively in researches on the tsetse-fly, and although at first sight they may appear rather complicated, the system of marking and re-marking provides the required data at once with a minimum of references to field-notes. Butterflies have been marked by Brett (1936) by placing spots of cellulose paints on the under surfaces of the wings,

and by Fletcher (1936) by rubbing clear of scales a small area of the wings and attaching to the bare patch a small label by means of Canada balsam, the label of tracing-paper being written on in Indian ink. Further details and additional references will be found in the places cited.

These methods of marking are designed to give information on many points; in the Odonata, for example, the movements, colour changes during maturity, length of life, as well as the population numbers and other points of interest, may be studied successfully in the field and without thereby affecting the population itself, provided the species can readily be recognized in the field. But if all that is desired, or is practicable, is to estimate the abundance of a species or of several species, it would suffice to place the same mark on every individual captured; naturally any insects which may be recaptured after having been marked are not added to the total count. By this means we can obtain, with a little more trouble, a more exact estimate of the population than we can from observation alone. But still we cannot expect that every individual will be successfully captured and marked, particularly if the species is very numerous. A yet more reliable method of estimating the true population density is as follows:

Jackson (1936) has shown that in marking experiments an estimation of the total population, P , may be obtained by means of the formula—

$$\frac{\text{insects marked 1st period} \times \text{insects marked 2nd period}}{\text{insects marked 1st period and recaptured 2nd period}} = P.$$

To obtain the data for this calculation we not only have to count the numbers of specimens we mark, but also the number of marked specimens which are recaptured in each successive period of observation, such periods varying from a day to a week or so, according to the insect under investigation. The specimens captured in the first period might be marked with one dot, two dots during the second period, etc. Jackson notes that this estimate may be seriously affected by two factors, the wandering of the insects out of and into the area of observation, and the replacement of insects dying by insects emerging. The first source of error may be minimized by conducting the experiment in a confined area from and into which the species cannot, or is not likely to stray; details of a method to overcome the second source of error will be found in Jackson's paper.

Even if we have obtained estimates of the total populations of two or more species occurring together, it does not tell us the relative ecological importance of the species in the locality, or what may be termed their population pressures; for example, the

population density of a small species may be large, that of a large species occurring with it much smaller, and yet it may be that the greater size of the larger species gives it ecological dominance over the more numerous smaller species. To obtain an estimate of the population pressure we must therefore multiply the population density estimate by a factor for the size of the species. For aerial species, the average weight of an individual may be taken as the multiplying factor; for aquatic species Omer-Cooper and Tottenham (1932) have used the average volume of an individual, the average weight being obtained by weighing together a sufficient number (according to the apparatus used) of living or recently dead (not dried) specimens of the species and dividing the result by the number of specimens weighed, the average volume similarly obtained by the displacement of water in a graduated vessel. (Marking methods have not of course been applied to aquatic insects, the estimates being based on quantitative sampling, thus involving the preservation of specimens and direct interference with the population numbers.)

Lastly, Balfour-Browne (1928) has shown how to obtain figures which give an estimate of the relative degree of concentration of a species in its different types of habitat, and which may be used for comparison with similar figures for other species; two species having the same relative degree of concentration in the same type of habitat may be described as being of equal importance in that type of habitat. It should be noted that this is not an estimate of the population, but of the relative frequency with which a species, as a whole, may be expected to occur in any one type of habitat. The figures are obtained as follows: if A is the number of collections made in habitats of one type, a the number of these collections which contain a certain species, B and b , C and c , etc., similarly the collections made in a second and third type of habitat, then the relative degree of concentration of the species in the first type of habitat is given by the formula—

$$\frac{100a}{A} + \frac{100b}{B} + \frac{100c}{C}$$

the percentage occurrence in the one type of habitat divided by the sum of the percentages of occurrence in each type of habitat.

REFERENCES.

- BALFOUR-BROWNE, F.—1928, "The Aquatic Coleoptera of the Wicken Fen Area, Cambridgeshire", in Gardiner, *Nat. Hist. Wicken Fen* (3): 201-214.
 BORROR, D. J.—1934, "Ecological Studies of *Argia moesta* Hagen (Odonata: Coenagrionidae) by Means of Marking", *Ohio J. Sci.*, 34: 97-108, 17 figs.

BRETT, G. A.—1936, " 'Marking' *Vanessa atalanta* ", *Entomologist*, **69** : 263.
 FLETCHER, T. B.—1936, "Marked Migrant Butterflies", *Ent. Rec.*, **48** : 105-106.

JACKSON, C. H. N.—1936, "The Use of the 'Recovery Index' in Estimating the True Density of Tsetse Flies", *Appendix 3*, pp. 530-532, in Swynnerton, "The Tsetse Flies of East Africa," *Trans. R. ent. Soc. Lond.*, **84**.

MEDER, O.—1926, "Ueber die Kennzeichnung von Weisslingen zwecks Erfassung ihrer Wanderungen", *Int. ent. Z.*, **19** : 325-330, 2 figs.

OMER-COOPER, J., and TOTTENHAM, C. E.—1932, "The Coleoptera of Wicken Fen. III, Hydradephaga; IV, Palpicornia; V, Staphylinidae—Ipidae". In Gardiner, *Nat. Hist. Wicken Fen* (6) : 489-538, 2 figs.

SWYNNERTON, C. F. M.—1936, "Technique of Marking Flies", pp. 41-42, pl. 21, in "The Tsetse Flies of East Africa," *Trans. R. ent. Soc. Lond.*, **84**.

VALLE, K. J.—1926a, "Entomofaunistiikkamme kehittämisestä", *Notul. ent., Helsingf.*, **6** : 56-59.—1926b, "Turun ympäristöjen sudenkorennoiset ynnä havaintoja niiden esintymisestä muualla Varsinais-Suomessa. (Die Odonaten der Umgebung von Turku nebst Beobachtungen über ihr Auftreten im übrigen Varsinais-Suomi [Eigentlichen Finnland])", *Ann. Univ. abo.*, **2** (5) : 1-35.

Norwood Hill House,
 Horley, Surrey.

ABERRATION OF *COLIAS CROCEUS*.—I had the pleasure of capturing a variety of *Colias croceus* at St. Antony, a small village near Falmouth, Cornwall, in early August, 1936. It has the orange blotch on the right hind wing entirely absent, this being replaced by a dark yellow patch. The wing is slightly creased, but only around the place where the spot should be. The underside is ordinary, except that the colour is slightly lighter. Otherwise it is a normal specimen.—R. L. WILKS; No. 2 House, Malvern College, Malvern.

POLYGONIA C-ALBUM IN 1937.—Very few records of this species reached me in 1937. It seems to be fairly well established now in most of the new territory it has invaded in the southern counties, but was not by any means so common in many of its new localities as it had been in 1936. A further eastward extension of its range is evidenced by records from Ipswich (October 31st, K. H. Seacombe) and from Dovercourt (October 17th, H. B. (hipperfield).—N. D. R.

CATOCALA NUPTA IN NOTTINGHAMSHIRE.—This species seems to be spreading northwards. I have been about 26 years in Upton, Notts, but had never seen it, either at sugar or at rest, until September 14th, 1936, when I took two on my sister's walls. They seem to like to settle on brickwork and telegraph poles, for I took another settled on a telegraph pole just opposite my garden. Again this year I saw a specimen on the brickwork of my garden wall on September 26th, 1937, but had neither net nor box, so could not get it. We have a lot of old willows round my little field at the back of the house, so I think the larvæ may feed there although I have never seen any.—A. S. B. F. P. WYNNE; Upton House, Upton, nr. Newark, Notts.

[This species is mentioned by Carr (*Invertebrate Fauna of Nottinghamshire*), but only as an unconfirmed record from Sherwood Forest.—N. D. R.]

CATOCALA FRAXINI, L.: A NEW BRITISH RECORD OF CAPTURE AND BREEDING.

BY DR. E. A. COCKAYNE, C. N. HAWKINS, FRANK H. LEES,
SIR BECKWITH WHITEHOUSE AND DR. HAROLD B. WILLIAMS.

PART 2A. BY DR. HAROLD B. WILLIAMS.

(Continued from vol. lxx, p. 272.)

On June 19th another larva died, and on the 21st 2 more. These, and all the 11 other larvae I lost, except the 2 which died on hatching and the 1 killed by accident, failed to resume feeding after a moult, and gradually shrivelled, turning a deep yellow-brown in colour. This occurred twice in the same box, and although the condition was new to me and resembled Mr. Hawkins's experience in the time of onset, it appeared to me that it might be an infectious condition, and the larvae were transferred to ordinary home-made cages having a muslin frame on a wooden base. I lost no more, and if there had been further broods I should have been bold enough to "treat 'em rough" as soon as they were half an inch long. I find that when I cut Lombardy poplar in my garden and insert the cut stems in water immediately, the leaves remain perfectly fresh for at least a week.

On June 24th the largest larva was resting for the 6th moult and 7 (including Larva No. 1) had moulted for the 5th time. On June 30th the 2 largest, having moulted 7 times, appeared to be full fed, and on July 5th they had gone down into moss. From now on it was merely a question of satisfying the hunger of 17 large larvae, and the last pupated on August 18th. In the last skin the larvae devour the whole leaf, leaving only the stalk.

The first imago, a male, emerged on August 21st. It was not out at 11 p.m. on the 20th. On the morning of the 22nd a dark female, which had not been out at midnight, was found. Two more emerged, a male and a female, on September 1st, and I then handed the remaining pupae, and 3 of the imagines, over to Dr. Cockayne, retaining by arrangement with him the last female, which I endeavoured unsuccessfully to pair with male *Catocala nupta*, pupae of which had been obtained for the purpose. This experiment resulted in the ruin of a perfect specimen, and would not have been undertaken had we foreseen the possibility of losing the strain.

Larva No. 1, at the 7th moult, failed to discard the old larval head, which remained covering the mouth-parts until July 18th 2 days after the moult. This is a not uncommon accident, and in my experience has been incurable. However, the occasion demanded desperate measures, and I gave the larva a whiff of chloroform, and then removed the old head-piece with fine forceps

and an old razor-blade. No injury appeared to be caused in the course of this rough and ready operation, but the larva remained in one position without feeding until July 20th, when it began to feed, and in due course pupated.

The following notes of Larva No. 1, compared with 1909 notes, may be of interest :

	1936. Larva No. 1.	1909. A.	1909. B.
Hatched . . .	17.v.1936 .	26.iv.1909 .	2.v.1909
1st moult . . .	22.v.1936 .	4.v.1909 .	11.v.1909
2nd moult . . .	27.v.1936 .	9.v.1909 .	19.v.1909
3rd moult . . .	5.vi.1936 .	17.v.1909 .	24.v.1909
Resting for 4th . . .	11.vi.1936 .	.. .	..
4th moult . . .	12.vi.1936 .	26.v.1909 .	8.vi.1909
Resting for 5th . . .	21.vi.1936 .	.. .	..
5th moult . . .	22.vi.1936 .	2.vi.1909 .	15.vi.1909
Resting for 6th . . .	3.vii.1936 .	.. .	..
6th moult . . .	5.vii.1936 .	8.vi.1909 .	22.vi.1909
Resting for 7th . . .	13.vii.1936 .	.. .	..
7th moult . . .	16.vii.1936 .	.. .	29.vi.1909

It is clear that the number of moults is not uniform, but in my experience it has been 7, with the exception of the 2 most advanced larvae of 1909. Most of the 1909 larvae were fed in open cages, as were those reared in 1936, and the explanation of the variation suggested by Mr. Hawkins is consistent with my limited experience. There is not, I think, any corresponding difference in the size of the moths.

While I did not share the exciting adventures described in Mr. Hawkins's introductory paragraphs, it has been a great privilege to be entrusted with the rearing of these rare and beautiful insects. It is perhaps not without some relevance to this paper to observe that in September, 1900, I found *C. fraxini* at rest on the wall of a farmhouse no very great distance from the scene of the present capture, but failed to secure it.

Redmayes, Hampton ;
November 28th, 1936.

PART 2B. BY DR. E. A. COCKAYNE.

On September 1st Dr. H. B. Williams handed over his remaining 15 pupae of *fraxini*, and the moths emerged on the following dates: September 2nd 1 ♀, 3rd 1 ♂, 1 ♀; 4th 1 ♂; 5th 1 ♀; 6th 1 ♀; 7th 2 ♀♀; 10th 1 ♂; 14th 1 ♂, 2 ♀♀; 21st 1 ♀, and 22nd 1 ♀. All emerged during the night or early hours of the morning, the 3 earliest had the wings fully expanded but still

raised over the back at 9.45, 10 and 10.10 p.m. summer time, but the majority emerged after midnight. Those I had an opportunity of watching rested for at least 2 hours without moving, but climbed higher up before 8 in the morning. Two, which I found when I came home at 2 a.m., had moved higher up by breakfast time, and one, which emerged about 11.30, had moved already at 5 a.m., but was resting quietly with its wings flat. I think their habit is to climb up to a height of about 12 to 18 in. to dry their wings and then climb to a height of 30 in. or more, for the cage was 33 in. high and 2 or 3 were found at rest on the roof in the morning. The period from the time the last 4 larvae spun their cocoons to the time the moths emerged was 47, 40, 45 and 40 days respectively, assuming that they emerged in the order in which the larvae spun up. One pupa, which was deformed, died, but perfect moths emerged from all the others.

PART 3. BY PROF. SIR BECKWITH WHITEHOUSE.

On February 24th, 1936, Mr. C. N. Hawkins very kindly forwarded to me 99 eggs of *Catocala fraxini*, which had been laid by the female taken by him and Dr. Cockayne in September, 1935, in Kent. The actual details concerning the capture are adequately recorded in the preceding account by the captor. Sufficient, therefore, is it for me to remark that I had the interesting experience of being present upon the occasion, and can confirm Mr. Hawkins's statement in all particulars.

The eggs received by me on February 25th, 1936, were attached to the gauze upon which they had been deposited in small groups of 3 to 10. They were divided into 4 equal batches, each piece of gauze being placed upon dry blotting-paper in a glass-covered tin box. The boxes were placed upon cocoanut fibre in a large flower pot covered by gauze, and stored out-of-doors under a covered verandah. Here they remained until the middle of April, being inspected daily from the first of April onwards.

Dr. Harold B. Williams has referred to ova of *C. fraxini* received from Mr. A. James, of Tooting Grove, laid by a female taken at Horsham, Sussex, on September 3rd, 1908. I also received a batch of these ova, and bred a small series in 1909. Further, I was able to obtain a pairing, and subsequently maintained the same strain for 3 successive seasons. The "James" ova hatched during the middle of April, 1909, and some difficulty was experienced in obtaining poplar sufficiently well in leaf to provide pabulum. The actual species available was *Populus nigra*, var. *Italica* (Lombardy poplar), a tree comparatively common in the gardens of the Birmingham suburbs. The Horsham larvae thrived upon

this food, and in the light of this experience I decided to use the same species of poplar for the present experiment, a further inducement being that several old trees were present in my garden. In order to have food available should the ova hatch at an early date, the precaution was taken of forcing a few twigs under glass every few days from the beginning of April onwards.

As a matter of fact these precautions proved to be unnecessary, since the first 2 larvae did not appear until the morning of May 14th. It was with great relief that I notified this fact by wire to Mr. Hawkins, as although evidence of fertility had been present in the ova for days, the late hatch was causing me concern in the light of previous experience. Indeed, when May 7th passed without any evidence of hatching, I thought it wise to expose the ova daily for an hour or two to sunlight when available.

From May 14th, hatching proceeded regularly until May 23rd, when the last 2 larvae emerged, the actual dates being recorded as below :

May 14th, 2 larvae	.	May 18th, 15 larvae
„ 15th, 3 „	.	„ 19th, 7 „
„ 16th, 13 „	.	„ 23rd, 2 „
„ 17th, 11 „		

Forty-six eggs failed to hatch (a mortality of 46·4%) in spite of the fact that all had been maintained from the time of receipt under precisely the same conditions. Four of the later larvae refused to eat and were found dead the day following emergence.

The small larvae, as soon as hatched, were transferred immediately to glass-topped metal boxes containing fresh young leaves of *Populus nigra*, 5 larvae being placed in each box. They were very active, especially at night, and at this early stage their Geometrid resemblance was very evident. During the day they appeared to rest, often lying at full-length along the mid-rib of the leaf and along the stalk.

By May 24th the earlier larvae were in the second instar and all feeding well. They rapidly increased in size, and from the 3rd instar were transferred to a type of perforated zinc and "cellophane" circular breeding-cage, specially built in progressive sizes to accommodate the larvae without overcrowding. On June 20th a disaster occurred. It was a very hot day and in one of the breeding-cages it was noticed by my gardener that the poplar leaves were commencing to droop. He, therefore on his own responsibility, replaced some of the wilting stems with fresh branches, and in so doing discarded several of the larvae! Fortunately he did not throw the faded twigs away, and the breeding-cage was in a closed conservatory. I therefore was able to recover all but 8 of the larvae, leaving me with a total of 41 feeding on June 21st.

On July 1st the largest larvae were in the last instar, and all were of considerable size. To keep them supplied daily with fresh food was a serious undertaking, as my poplar trees were old and all the lower branches had, by this time, been utilized. "Sleeving" which was the ideal solution, was not possible, owing to the height of the trees and the difficulty of access to suitable branches. Poplar is not an easy tree to maintain in a fresh condition, and my experience with an open breeding-cage, where a free passage of air is available, has shown that a daily change of food is essential. Owing to evaporation, the leaves quickly shrivel.

During the later instars the larvae lie at full-length along the larger branches, often near the bottom of the breeding-cage and close to the receptacle containing water. Changing the food is therefore not an easy task, and it is possible that disturbance of the larvae at this stage accounted for a further list of casualties. As a matter of fact, it was found most convenient to carry out this operation at night, when the larvae are active, and easily seen on the food-plant. During the day-time, the position and shape of the larvae, closely applied to the poplar twigs, render detection by no means easy, and although no damage was actually noted, it is possible that minor injuries, sufficient later to cause death, may have been produced by twigs touching one another. "Moulting" also proved to be a difficult and expensive process, since at each epoch, one or two larvae were lost. Instead of the change being effected in the usual and normal manner, the larvae appeared to waste and finally dry up. Spraying of the foliage with fresh water seemed to reduce casualties of this type, but the total loss was heavy.

By July 4th, 31 larvae only were feeding. One larva—the first—commenced to spin its cocoon on July 3rd. By July 9th 9 larvae had pupated, and by the 16th, 16 cocoons were present in the breeding-cage. The last larva did not pupate until August 10th, *i. e.* 79 days from the date of hatching. No attempt was made to interfere with the cocoons, except when it was obvious that 2 larvae had spun in close proximity. In such cases the cocoons were easily separated, and in no instance was it necessary to remove an individual pupa from its cocoon. The latter were composed of dried poplar leaves, and sporogenous moss placed at the bottom of the breeding-cage. Twenty-five cocoons were obtained from the 53 larvae hatched. If the 8 larvae that escaped are deducted, this leaves a percentage of 60.9 which reached the pupal stage. This figure actually represents the final result, since 25 perfect imagines hatched from the respective pupae.

(To be continued.)

THE RHOPALOCERA OF THE ISLANDS OF COLL, CANNA, SANDAY, RHUM, EIGG, SOAY, AND PABBAY (INNER HEBRIDES), AND OF BARRA, MINGULAY, AND BERNERAY (OUTER HEBRIDES).

BY J. W. HESLOP HARRISON, D.Sc., F.R.S.

IN 1936 I conducted a biological expedition from the Department of Botany, King's College, University of Durham, to investigate the flora and fauna of the Islands of South Rona, Raasay, and Scalpay. During the course of our stay on the latter island I wrote a short account of the butterflies observed there, and this appeared in the *Entomologist* for January, 1937. This year, in order to extend our knowledge of the natural history of the other islands lying in greater or less proximity to Skye, a further expedition was organized, with its base on Soay, a small island just south of the Cuillin Mountains. From that island, with the aid of a motor boat, we worked Canna (with Sanday), Rhum, and Eigg, which are situated ten, six and thirteen miles respectively to the southward.

In addition, two members of the expedition, Dr. W. A. Clark and my son, Dr. George Heslop Harrison, examined Coll, Mingulay, and Berneray, incidentally, whilst awaiting the arrival of the boat which was to convey them to the southernmost of the Outer Islands, making some notes on Barra.

Later, after the conclusion of our work on Soay and its more extensive neighbours, we returned to our old headquarters on Raasay, whence an excursion was made to Pabbay, the only island of any size north of Skye not previously investigated.

The present paper, based on collections made by my son and myself, embodies the results of these researches, and forms a complement to the earlier publication.

Argynnis aglaia L.—This butterfly has proved to be one of the commonest and most widely distributed insects in the Hebrides, both Inner and Outer, for it was captured in all the islands named above except Coll, Eigg, and Pabbay. Of these islands it may be really absent from the last, but I feel sure that its detection on the others is merely a matter of time—and fine weather! Although most of the females were distinctly darker than usual, and certainly to be described as falling within the limits of the var. *scotica* Watk., none was of the extreme dark, or even melanic form, we noted on South Rona and Northern Raasay. Perhaps Soay examples approach nearest to these.

A. selene L.—Just lingering in late July on Soay, in the valleys in the Northern half of the island. It was also captured on the shores of Loch Coruisk on Skye. All the specimens taken belonged to the var. *insularum* Harrison. I have no doubt but that an

earlier visit would have revealed its presence on the other Inner Hebridean islands.

Aglais urticae L.—Common everywhere on all the islands in the form of examples a little more “contrasty” than English specimens.

Nymphalis io L.—A single individual on Coll in April and one on Barra, which confirm the general tendency the species has exhibited recently of extending its range to the north.

Vanessa atalanta L.—On Coll, Eigg, Canna, and Sanday.

V. cardui L.—Imagines seen on Coll, and larvae abundant on thistles on the Kilmory sand dunes on Rhum.

Eumenis semele L.—Common on every island except Pabbay; probably most abundant on Canna, Sanday, and Rhum. The specimens from Mingulay and Berneray seem worthy of further and extended study. On Soay the species was restricted, for reasons not immediately obvious, to the rocks on the isthmus between Soay Harbour and Camas nan Gall.

Maniola jurtina L.—Plentiful; Mingulay, Berneray, Coll, and Canna examples are very highly coloured and should, in all probability, be referred to as var. *splendula* B.-W., although some approach the Irish race. Pabbay examples are very dull in coloration.

Erebia aethiops Esp.—An isolated specimen in a *Molinia* “slack” on Rhum; careful and exhaustive searches failed to reveal further examples either there or elsewhere on the islands.

Coenonympha tullia Müll.—As var. *scotica* in some numbers on Coll, Soay, and Rhum, and in less quantity on Mingulay and Canna. A single belated female, taken late in August, represented the species on Pabbay.

C. pamphilus L.—Noticed on every island save Barra, where an examination earlier in the season would possibly reveal its presence.

Callophrys rubi L.—Reported only from Coll, where it was taken by Dr. G. Heslop Harrison in April. It should occur on the whole of the Eigg, Rhum, Canna group, but sweeping for the larvae on those islands ended in failure.

Polyommatus icarus Rott.—Far from uncommon on all the islands and generally with females appertaining to the var. *caerulea*. Mingulay and Berneray insects were markedly smaller than one usually finds in univoltine races; perhaps this resulted from drought earlier in the season.

Pieris napi L.—Common on Coll, Pabbay, Soay, Rhum, Eigg, Sanday, and Canna; a single example taken on Barra provides, I believe, a new record for that island. In facies, the whole of the specimens taken bear a strong resemblance to the darkish Raasay race.

P. rapae L.—One specimen on Canna and one on Barra; more commonly on Eigg.

P. brassicae L.—Rare on Canna, a few on Barra, and excessively common as larvae and pupae on Pabbay. The lighthouse keeper on Berneray reports the occasional presence of the species on that island. In my opinion its abundance on Pabbay was, to a considerable extent, due to immigration earlier in the year. Nevertheless it should be emphasized that at least two different lots were represented, one as innumerable pupae on the walls of the single house on the island, and the other as half-grown larvae on cabbages growing in the centre. Although there was no sign of *Microgaster* infestation, the majority of the pupae were dead or dying. This seems to confirm my views as to the origin of the batch near the shore.

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NOTES AND OBSERVATIONS.

MACROLEPIDOPTERA FROM IRELAND.—The following are some new locality records for Irish Macrolepidoptera, including one species, *Lithosia griseola*, which is new to Ireland. *Leptidea sinapis*: The Quill, co. Wicklow, near Wexford. *Sesia scoliaeformis*. Muckross, Killarney, 1 flying around a birch tree in the sunlight 29.vii.37. *Oeonistis quadra*: Seapoint, Monkstown, co. Dublin, 1 ♂ at light; Muckross, Cahirnane, Kenmare demesne, common, and Flesk, Killarney, very common at light. *Lithosia depressa (deplana)*: Cahirnane, 7, Kenmare demesne, 1, and Flesk, Killarney, 1: kindly identified for me by Mr. Edelsten of the British Museum (Natural History). *L. griseola*: On 26.viii.36 I captured a *Lithosia* in Muckross, Killarney, among phragmites on the shores of Lough Leane. Not recognizing it I sent it to the British Museum, where it was identified as *L. griseola* var. *flava*. I got a second specimen at light in a moth-trap at Flesk, Killarney, 9.viii.37, which I also sent to the British Museum, where it was identified as *L. griseola* var. *unicolor* Bankes.* This species has not previously been recorded from Ireland. *Odonestis potatoria*: Park, Wexford. *Notodonta tremula*: Seapoint. *Calamia lutosa*: Seapoint, 21.ix.36, and 1.x.37. *Apamea ophiogramma*: Seapoint. *Agrotis lungera*: Seapoint, 2. *Epunda lichenea*: Seapoint, abundant, often extremely so. It is by far the commonest species at light; from the end of August to the beginning of October I could take almost any number. Glenageary, co. Dublin, 1. *Taeniocampa opima*: Seapoint, 1. *Chariclea umbra*: Seapoint, 3 in 1936, 2 in 1937. *Sarothrips revayanus*: Glen o' Downs, co. Wicklow; Muckross, Kenmare demesne, and Upper lake,

* Some confusion appears to have arisen here as *unicolor* is an aberration of *L. deplana*, not *L. griseola*.—H M E.

Killarney. *Phytometra viridaria*: Glen o' Downs. *Hypenoides costaestrigalis*: Muckcross, Killarney. *Acidalia floslactata*: Glen o' Downs. *A. immutata*: Newcastle Marsh, co. Wicklow; Ferryearrig, Wexford. *Eubolia clavaria*: Seapoint, common. *Oporabia filigrammaria*: Seapoint, 1; Devil's Glen, co. Wicklow, bred, 1. *Cidaria silaceata*: Flesk, Killarney, 3. *C. fulvata*: Seapoint, 3. *C. pruinata*: Seapoint, fairly common; Flesk, Killarney. *Anticlea derivata*: Enniskerry, co. Wicklow; Seapoint. *Emmelesia bifasciata*: Seapoint. *Thera firmata*: Flesk, Killarney. *Eupithecia tripunctaria*: Muckcross, Killarney, 5.viii.37. *Numeraria pulveraria*: Seapoint. *Ennomos alniaria*: Seapoint; Flesk, Killarney. With the exception of *C. fulvata* all the above species from Seapoint were taken at light in a moth-trap.—BRYAN P. BEIRNE; 4, Tobernea Terrace, Monkstown, co. Dublin, Irish Free State.

RECENT LITERATURE.

The Dragonflies of the British Isles. By CYNTHIA LONGFIELD, F.R.E.S. London: F. Warne & Co., 1937. Pp. 220; 38 plates; text illustrated. Price 7s. 6d.

This excellent volume at last fills a long-felt gap in our literature on British Odonata, for it is thirty-seven years since Lucas's *British Dragonflies* appeared, and that work was already out of date a few years after its publication, and has long been out of print. The present work opens with a diagram of external anatomy and a glossary, followed by a table of pronunciation of Latin names, a general account of the life-history (including remarks on biology, ecology, palaeontology, etc.), methods of collection and preservation, a table of first appearances of adults, two keys to species, descriptions of each species, and concludes with a chapter on classification and a check list; the latest revised nomenclature is used, the more recently displaced names also being mentioned. A complete index is provided. Miss Longfield has been at great pains to provide English names for the species, the first time this has been attempted systematically for our fauna. One could criticize many of her choices, but it is doubtful whether more convenient and compact names would be easy to find. But the distinction made between "Dragonflies" (*Odonata*) and "Dragon-flies" (*Anisoptera*) is unfortunate, and the American "Damsel-flies" appears for *Zygoptera*. The intention in introducing these English names was to popularize the Order; but as each name generally includes the name of the genus, these might not perhaps prove to be as "popular" as is hoped; and if one has to master the generic names, would the addition of the specific names be such an overwhelming task? The keys are an unusual and noteworthy feature for this type of book; the first is based on the principal colours, and

* See also the general criticisms in Williamson, 1931, "Common Names for Dragonflies", *Ent. News*, 42: 46-50.

obviously can only be applied as a rough guide to the living insects; the second key is more detailed, and although not based on characters usually to be found in taxonomic keys, probably works well, and has at least been tested out on non-entomologists before publication. One could have wished that in the descriptions more attention had been given to structural features in some of the more difficult species, and the text-figures of structural details are too small to be of much value, but on the whole the descriptions are adequate and to the point. Another excellent feature is that the distributional records have been combed thoroughly, and under each species are enumerated the counties in which it has (or has not) been found, followed by a brief indication of its range outside Great Britain. The larvae have necessarily been dealt with more summarily, but the plates also provide reduced copies of Lucas's Ray Society figures, so that a general idea of the forms in the different groups can be obtained. Throughout the work the mere collector has been sternly discouraged, and the rarer species, and even common species in unusual localities, are strongly recommended for preservation as living colonies and not as dead specimens. It is to be hoped that the book, with this emphasis, will attract greater interest to the Order, and be the means of eventually adding to our still meagre knowledge of the biology of our species. Although an avowedly popular work, it contains much information of value to every Odonatist.

J. COWLEY.

Proceedings of the South London Entomological Society, 1936-37.

I have often wondered whether anybody has ever seriously considered making a subject index to the *Proceedings* of the South London Society. Turning over the pages of this volume, one comes quite by chance on such things as the first host records of the Chalcid, *Entedon euphorion* Walk., a record of sparrows attacking *Plusia gamma*, and of *Cicadella montana* Scop. in Surrey. There must be a wealth of miscellaneous observations of interest buried in past volumes, which few people ever consult. Amongst the papers in this volume there are several of particular interest, notably the President's account of his experiences with Cynipid galls, F. Stanley Smith's account of *Cosmia ocellaris*, and C. N. Hawkins's notes on the genetics of *Eraunias defoliaria*. The volume is well up to standard in interest, and the reports of the meetings, both at the Society's rooms and in the field, seem much improved.

The Locust Outbreak in Africa and Western Asia in 1936.

This publication of the Economic Advisory Council is issued by H.M. Stationery Office at 3s. It is the sixth report in the series and deals with the same three species, the Desert, African Migratory and Red Locusts. Most of it is devoted to tracing the movements of various swarms during the year. The organization of international co-operation in anti-locust work is now yielding most valuable results. The beginning of a fresh outbreak of the Desert Locust has been

recognized, and it has been possible therefore to warn the governments of the countries likely to be invaded, thus removing one of the terrors associated with locust swarms, and enabling preparations to be made to meet the attack. Now that the outbreak centres have been located, it should be possible, granted the willing and active co-operation of the governments concerned, to go even further, and to impose permanent control upon the locusts of Africa.—N. D. R.

United States Department of Agriculture.

Circular No. 439. Parasitization of the Mediterranean Fruit-fly in Hawaii, 1914-33. By H. F. Willard and A. C. Mason. This is a most interesting account of four parasites introduced to control the fruit-fly, which was itself introduced. The parasite (*Opius humiles*) which first became abundant was after two or three years quickly superseded in effectiveness by a second species of the same genus (*O. bryoni*). The deciding factors appear to have been the texture of the skin and the thickness of the various host fruits.

Picture Sheets, Nos. 1-3. On the front of these new single sheets are given coloured figures of the insect in all its stages, and on the back a brief account of its life-history and of control measures. This appears to be a new departure and ought to be very successful. The insects dealt with are Tomato Hornworms (Hawk moths of the genus *Protoparce*), the Mexican Bean Beetle (*Epilachna varivestis*), and the Colorado Beetle (*Leptinotarsa decemlineata*).

The Microscope.

As many branches of entomology cannot be pursued without the aid of a microscope and the knowledge of how to use it, this new journal, which published its first issue in August, 1936, may appeal to many readers. It is a monthly, and not too severely technical. The first issue contains an article on *Musca domestica* with some quite good illustrations, and a note on a simple drawing device, amongst others. This issue is well got-up and well illustrated. The publishers are Arthur Barron, Ltd.—N. D. R.

SOCIETIES.

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held at "Priary Hill", Weybridge, on July 28th, 1937. Mr. H. Willoughby-Ellis in the Chair. Members present in addition to the Chairman: Mr. Jas. E. Collin, Dr. Harry Eltringham. Visitors present: Dr. K. G. Blair, Mr. L. F. Barton, Mr. C. L. Collenette, Mr. H. M. Edelsten, Dr. Karl Jordan, Mr. N. D. Riley, Mr. W. Rait-Smith, Dr. Hugh Scott, Mr. W. H. T. Tams. The meeting was called for 2.30 and the guests were received by the Chairman and Mrs. Willoughby-Ellis. The weather was fine and very warm. Large

numbers of the Tingid bug *Leptobursa rhododendri* Horv., recently discovered in this country, were observed on the rhododendrons, and also one specimen of the Homopteron *Graptoccephala coccinea* Först., was found later also on rhododendron, indicating that this insect, recently introduced to the British list, has during a short time spread from Chobham, where it originally occurred in numbers, to Weybridge, a distance of about seven miles. Mr. Edelsten exhibited a remarkable aberration of *Spilosoma lubricipeda*, almost spotless and with a black border round the upper wings, thickened at the apex and outer margin and extending along three-quarters of the inner margin, the hind wings also had a black border. The specimen came to light at Wood Walton Fen on June 12th, 1937. During dinner Dr. Blair showed an old and interesting Entomological Club invitation sent by Matthew Marshall, who became a member of the Club in 1850. It was addressed to G. R. Waterhouse and dated May 19th, 1856, for the Club meeting to be held at the Bank of England. The Chairman's museum was open for inspection, the special exhibits being the extensive series of British *Longicornia*, *Buprestidae*, *Elatерidae* and *Heteromera*, all of which have recently been re-arranged. Dinner was served at 6.45 and a long evening was spent when the members of the Club stayed the night and the visitors dispersed between the hours of ten and eleven.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).

ENTOMOLOGICAL CLUB.—A Meeting of the Entomological Club was held at 5, Hereford Square, on October 9th, 1937, Major Philip P. Graves in the Chair. Members present in addition to the Chairman: Mr. H. St J. K. Donisthorpe, Mr. H. Willoughby Ellis, Mr. Jas. E. Collin. Visitor present: Dr. B. P. Uvarov. The meeting was called for 7 o'clock, and the guests were received by the Chairman and Mrs. Philip Graves. After dinner a reception was held, at which many friends of the Chairman were present, amongst whom were Sir Guy A. K. Marshall, Mr. Francis Hemming and Mr. N. D. Riley. A buffet was provided, and the whole party dispersed at a late hour after a most pleasant entertainment.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*Thursday, September 9th, 1937.*—The President in the Chair.—Dr. H. B. Williams exhibited numerous species of Irish Lepidoptera with English representatives for comparison; Dr. Cockayne, the larva of *Mamestra albicollis*; Mr. T. R. Eagles, larva of *Hadena trifolii* and of *Eupithecia subnotata* and the egg-capsule of *Blatta orientalis*; Mr. Jacobs, the Dipteron *Sepsis punctum*, of which he had observed a dense swarm in Ashdown Forest over a very limited space in August; Mr. Wakely, *Myelois ceratoniae*, bred from a larva feeding in a Spanish orange, a *Stigmatella (Nepticula) suberivora* bred from mined *Quercus ilex* leaves, on behalf of Mr. Rudland, larvae of *Hyponomeuta vigintipunctata*, and on behalf of Mr. G. H. Cornish, larva of *Bedellia somnulentella*. Dr. H. B. Williams read a paper, Notes on Irish Lepidoptera.—HY. J. TURNER (*Hon. Editor of Proceedings*).

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THE LURE OF THE LAMP.

By RUSSELL JAMES, F.R.E.S.

THE late J. W. Tutt used to hold the theory that no species of moth was rare if only one learned its habits and knew how to take it. This probably is not entirely true, as there doubtless are some species that, for one cause or another, only manage to carry on a somewhat precarious existence, but in many instances Mr. Tutt's theory is proved to be correct. Two extreme rarities of his days that are found to be comparatively plentiful since their life-histories were discovered are *Sesia andreniformis* and *Boletobia fuliginaria*, but the most remarkable revolution in one's ideas concerning scarcity and plenty has been brought about in recent years by the systematic use of light.

Until quite recent times the use of lamp and sheet was practically unheard of except in the fens. There was a certain amount of searching street gas-lamps, and one occasionally heard of mild success with moth-traps and indoor light, but such instances were few and far between. To-day, largely through the advent of motor cars, powerful car head-lights or petrol vapour lamps are worked systematically everywhere. The result is that many species, formerly rare, are now easily obtained in plenty, and in no group of moths is this increase more marked than in the "Prominents", in a wide sense.

I remember in the days (in the "nineties", I fear!) when the old North London N.H. Soc. made annual Whitsuntide excursions to the New Forest, it was a common practice on a dull morning for the whole party to turn out for a "prominent" hunt among the oaks and beeches.

On one occasion the capture of a pair each of *Notodonta trepida* and *Drymonia trimacula* was considered an excellent morning's bag for the entire party. No one in those days ever thought of trying light, although on one occasion an unsuccessful attempt was made at "sembling" with a *trimacula* that subsequently proved to be a male. I wonder what those ardent searchers would have thought of the capture of eleven species of prominents in two nights on this very same ground—some of them in considerable numbers.

Yet this was the total taken on two late spring evenings last year by Mr. Geoffrey Cole.

As I should think this constitutes something of a record I give, with his permission, the list of species as follows: *Stauropus fagi* (a single early specimen), *Notodonta trepida*, *N. dromedarius*, *N. ziczac*, *Drymonia chaonia*, *Pheosia tremula*, *P. dictaeoides*, *Pterostoma palpina*, *Lophopteryx camelina*, *L. carmelita* (three) and *Clostera curtula*.

N. trepida was the most plentiful, but getting worn, and Mr. Cole tells me he could have taken nearly forty in the two nights. Had *D. trimacula* been out this might have added a twelfth species to the list, as it is generally the commonest "prominent" at light in the New Forest. We old collectors used to find the "prominents" exceedingly hard to get, most of them being regarded as great rarities, and it is only in recent years we have discovered how plentiful many of them really are.

Although we have had no such variety in a single night as Mr. Cole, my son and I have had some remarkable experiences at light in the last few years. One rather outstanding one was on the Jubilee night of 1935, when on the electric lamps in a South London suburb seventeen *Drymonia chaonia* were taken in beautiful condition, besides some worn ones left, and no less than 40 *Pheosia tremula* or *dictaeoides* observed; which we cannot say, as we had taken all we wanted of both species just previously on the same ground and so did not examine them.

During last year we were specially working up old ground in Epping Forest and have been astonished at the results from this once well-worked locality. First and foremost is *Stauropus fagi*. It is many years since I last heard of it being taken in the Forest, and even in the old days the capture of a specimen was an event. Moreover, the specimens taken in those days were practically all typical. Our captures at light this year totalled twenty specimens, of which eighteen were taken on the nights of June 11th and 12th. They are all of the so-called "black" form and mostly in lovely condition. They were all males and, unfortunately, the only female seen was missed. *Fagi* is, I believe, a fastidious beast and requires conditions exactly right for it to put in an appearance, but what those conditions are we have failed to determine. June 11th produced far more moths in general than June 12th, although the latter night attracted twelve *fagi* against six on the 11th.

Other nights before and after, apparently equally good, produced only one or none. With the exception of the one female we missed, which flew round and round, they appear from nowhere, just suddenly flop on the sheet—a ground one by the by. I think

they come straight down from above, but we never saw them fly ; they just are there ! We had our sheet right in among the trees, and I firmly believe that this is better for *fagi* than in the open.

Other prominents to turn up in the Forest were *Drymonia trimacula*, *P. palpina*, *N. dromedarius* and a fair number of *L. camelina*, and on the first of these evenings (11th) the moth of the evening in point of numbers was *Hylophila prasinana*. I have not usually connected *prasinana* very much with light, but on this occasion it swarmed ; as many as twenty or thirty on the sheet at once.

Two other remarkable nights were May 29th and 30th, when at one time thirty or more *Dasychira pudibunda* were on the sheet together and really long series of *Demas coryli* and *Eurymene dolobraria* could have been taken, both these species supposedly rare in the Forest. All the four common "Hook-tips" were well in evidence. *Ephyra trilinearia* very common, including some beautiful forms, and *Odontesia bidentata* in fair numbers. Three *Nola cristulalis* turned up and these, like *fagi*, were of a dark melanic form, whereas all the specimens I took in years gone by were strictly typical.

Yet another big night in the Forest was July 2nd, when the moth of the evening was *Boarmia roboraria* of the same dark form that I used to take in Ongar Park Wood. I know *roboraria* was reputed to occur in Epping Forest in the "nineties", although I never took it myself, but this night it was really common, some twenty-five or thirty specimens, including some females. Of course in all the species taken at light males vastly predominate, but at any rate among the prominents a fair number of females occur, considerably more indeed than we could formerly obtain of both sexes combined by other means. Another plentiful species on this night was *Phorodesma bajularia*, again including females and, for once, in unusually good condition.

These evenings at light have proved Epping Forest still to be a very happy hunting-ground. Besides the species mentioned, there were several others that had been strangers to me in many years collecting in the Forest, namely, *Agrotis strigula*, *Tephrosia luridata* (always common in Ongar Park Wood), *Selenia lunaria*, *Emmelesia affinitata* and *Eucosmia certata*, and many others that have always been familiar there. *Eucosmia certata* must have been a wanderer from some garden, as I know of no *Berberis* growing wild.

Only a few *D. trimacula* occurred in the Forest, and as I wanted the species badly, Mr. de Worms kindly took me to one of his localities near Ascot on June 7th. Although it was not by any means a first-class night *trimacula* occurred in sufficient numbers to enable me to pick out a good series in the one night, and at this late date a perfectly fresh *N. trepida* also occurred.

We had one more red-letter night in the summer, and that was on June 26th, in mid-Sussex. The expedition was made specially for *Cymatophora fluctuosa*, a species that has always nearly eluded me. Fired by glowing accounts by Mr. A. J. Hodges, some forty years ago, of his taking twenty-eight in one night on treacle in Wyre Forest, I have made many pilgrimages to that far-off locality, and only succeeded in getting single specimens at long intervals.

We had been down in Sussex on the 22nd—a damp, chilly night, after heavy rain, and got six specimens—two of them worn. My son followed this partial success by another visit on the 26th, when *fluctuosa* was so abundant that he desisted from taking them after picking about twenty-five selected specimens off the sheet and ignoring the very many that flew round and did not settle. A typical *S. fagi* was taken on each night and a perfectly fresh *D. trimacula* on the 26th. Other species on the 26th were *Calligenia miniata* (common), *Boarmia roboraria*, *Melanthia albicillata*, *Macaria notata* (very common, but many getting worn), *Lobophora sexalisata*, (common), *Acronicta leporina* (a very white form), *Asthena sylvata*, *Phycis betulae*, *Cochlidion testudo*, a few fresh *P. bajularia* selected from many faded ones, and a very beautiful variety of *Boarmia repandata* marked like var. *conversaria*, only fawn and deep brown instead of white and black.

A week spent in North Wales and Witherslack with my nephew, Dr. Grinling, of Sheffield, in early July, gave us no chance of testing the reaction to light in those localities, as we struck cold, wet and stormy weather all the time. Even so, on a night spent in the mountains behind Penmaenmaur, with the temperature so low and the wind so cold that an overcoat and cardigan failed to keep me warm, the lure of the lamp could not be resisted by *Acidalia contiguaria* and *Mamestra furva*, both of which came sparingly to the sheet.

On the way back a night and morning were spent in the historic Burnt Wood (which is apparently quite unspoiled) for a series of *Eupithecia debiliata*, which proved to be very common. The night was cold and unsuitable, but while watching the sheet I dreamed dreams, and wondered whether the shades of *Notodonta bicolor* haunted the wood in ghostly flight. Suddenly a pure white moth appeared, circled round and settled on the sheet. Alas! only *menthastris*! No, I fear it is too long ago since *bicolor* was taken to hope for it here again. But what about the Irish wilds, where the larva has been re-discovered? What about a serious campaign with lamp and sheet?

Perhaps some day one of us will try. And the result will be? Well, I wonder.

ADDITIONS TO THE BUTTERFLIES OF TOBAGO.

BY W. G. SHELDON.

A FURTHER sojourn in Tobago during the months of December, 1936, and January, 1937, resulted in the addition of a number of species to those mentioned in my paper, vol. lxix, pp. 200-208 of this magazine, and since my return Mr. Frank d'Abadie (not Dabadie as written in my former paper) has sent me a number of others. Altogether I am now able to add 23 species, making a total of 124 inhabiting Tobago, so far as at present observed. Unfortunately, owing to the abnormally wet season, I was unable to penetrate into the difficult forest reserve on the north side of the island, but since my return Mr. d'Abadie has made two expeditions into it. Several very interesting species were met with by him, and no doubt further investigation will result in the discovery of others.

After spending the month of December at Speyside, I moved on to the Robinson Crusoe Hotel, near Scarborough, at the south-east end of the island. The nature of the terrain there is very different from that of Speyside, the hills are nothing like so high and there are considerable areas of pasture land. Here I found quite a number of species that were not observed at Speyside.

My principal collecting-ground was in the lanes and fields of the Government farm, quite close to the hotel, where I found an abundance of specimens, and several species not met with previously by myself, and that are new to Tobago.

In the following list of species obtained by Mr. d'Abadie and myself I have indicated by an asterisk (*) those that have not hitherto been recorded from Tobago.

I have to thank Brigadier W. H. Evans, Mr. A. G. Gabriel and Mr. W. J. Kaye for assistance in naming the new species.

Danaus plexippus L.—Scarborough, not infrequent in the lanes and meadows.

Ithomia drymo pellucida Wey.—A specimen from the forest reserve (F. d'A.).

**Greta andromica* Hew.—One specimen captured and another seen near Hermitage on the north coast (W. G. S.); one specimen in the forest reserve (F. d'A.).

Anartia jatrophae L.—This common West India species is rare and very local at Speyside, but abundant at Scarborough (W. G. S.).

**Megalura peleus* Sulz.—Roxborough, rare (F. d'A.).

Morpho achilles L.—It was very satisfactory to be able to solve the problem of the identity of the Tobago *Morpho*. On December 10th, walking along the coast path between Charlotteville and

Hermitage, I saw a male settled on the path and had no difficulty in placing my net over it. I spent two other mornings on the same path, but did not see another. Since my return to England Mr. d'Abadie, on his second expedition to the forest reserve, saw three or four specimens, capturing one female; on the first expedition the butterfly was not seen. Subsequently he obtained one male from a coloured boy residing in the reserve; both of these are now in my possession.

The race, a very small one, resembles the Trinidad form, subsp. *insularis* Fruhs. No doubt in the recent geological past, when the islands were joined, the two races were identical. The following is a description of the Tobago race (as compared with *insularis*) for which I propose the name:

***Morpho achilles tobagoensis*, subsp. novo.**

The males in my possession expand 5 in., the females 5½ in. The wings of the male are a brilliant electric blue, deeper in colour and brighter than *insularis*. A striking distinction is the very narrow dark border to all the wings, which is not more than ¼ in. in width; the white blotch in the centre of the costal margin is square, not elongated; and the white spots in the dark hind marginal border of the front wings are smaller than in *insularis*. The female has the blue base of the front wings only extending as far from the base as the inner edge of the central white costal blotch; in both sexes the undersides have the ground-colour a more pronounced red; the ocelli are smaller and the pale lines and spots are not so pronounced as in *insularis*. *Tobagoensis* is obviously a very rare butterfly. It is almost confined to the forest reserve, which has an area of about 7000 acres. As, however, like its Trinidad relation, it frequents solely the ravines, its haunts must be very restricted. In one or two places it intrudes in very small numbers into the semi-cultivated areas, but again there it is restricted to the ravines. I could only hear of one or two specimens having been seen outside the forest reserve during the last several years.

**Lasaia narses* Stgr.—Roxborough (F. d'A.).

**Anteros formosus* Cram.—One example of this beautiful species was obtained in January at Roxborough by Mr. Cecil d'Abadie.

Emesis progne Godm.—One specimen from the forest reserve in March (F. d'A.).

**Theope eudocia* Hew.—Rare, settled on flowers alongside the path leading from Charlotteville to Hermitage; one specimen on each of two mornings (W. G. S.).

Imolus crolus Cram.—Not uncommon settled on flowers at Speyside and Scarborough (W. G. S.); Roxborough (F. d'A.).

**T. echion* L.—One specimen at Scarborough (W. G. S.), one at Roxborough (F. d'A.).

**Thecla zebina* Hew.—Two females, Scarborough (W. G. S.); one male and female, Roxborough (F. d'A.).

Calycopis sangala Hew.—Two specimens, Roxborough, (F. d'A.); Scarborough, one specimen (W. G. S.).

**Catopsilia philea* L.—Two males of this fine species were taken at Roxborough by F. d'A.

Eurema elathea Cram.—I had not seen this widely distributed West Indian species in Tobago until Scarborough was visited, where I found it was not rare in the lanes of the Government farm.

**Sphaenogona gratiosa* Dbl.—This species, quite rare in Trinidad, was abundant in the same localities as the last species (W. G. S.); also taken at Roxborough (F. d'A.).

**Glutophrissa drusilla* Cram.—One example taken at Roxborough (F. d'A.).

Pieris monuste L.—Abundant at Scarborough (W. G. S.).

**Urbanus undulatus* Hew.—Scarborough (W. G. S.).

**U. dorantes* Stoll.—Scarborough, abundant (W. G. S.).

**Phanes marshallii* Kirby.—One female, Speyside, amongst thick forest (W. G. S.).

**Celaenorrhinus eligus* Cram.—Two specimens in the same locality as the last species (W. G. S.).

**Niconiades xanthaphes* Hb.—Speyside, one specimen (W. G. S.).

**Carystus phorcus* Cram.—Scarborough, one specimen (W. G. S.).

Systacea erosa Hb.—Scarborough, two specimens (W. G. S.); Roxborough, one specimen (F. d'A.).

**Pellicea bromias* Godm.—Roxborough (F. d'A.).

**Talides sinon* Stoll.—Roxborough (F. d'A.).

**Atrytone pericia* Godm.—Scarborough, one specimen (W. G. S.).

**Mucia thya* Godm.—Scarborough (W. G. S.).

**Lerodea phocylides* Plötz.—Roxborough (F. d'A.).

**Lerema parumpunctata* H.-S.—Scarborough, one specimen (W. G. S.).

Megistias corticea Plötz.—Scarborough (W. G. S.).

**Hylephila phylaeus* Drury.—Roxborough, two males and two females (F. d'A.).

LITHOSIA CANIOLA HB. IN CORNWALL.—I can antedate Mr. C. Granville Clutterbuck's record of this moth by some years, as in June, 1919, I found four larvae feeding on the black lichens growing on rocks below the Lighthouse at the Lizard and successfully reared them. I searched for the larvae again this year, but was unable to find any.—A. R. HAYWARD; Misterton, Somerset, December 16th, 1937.

ALTERNATING GENERATIONS OF THE CYNIPIDAE.

BY H. J. BURKILL, M.A., F.R.G.S.

IN 1894 the Clarendon Press, Oxford, published a translation by Dr. C. R. Straton, of Dr. H. Adler's fascinating book showing how, by means of experimental research, he had been able to work out the inter-relationship of various generations of spring and autumn forms of the species of gall-inducing Cynipids.

Dr. Adler linked up eighteen agamous generations with their corresponding sexual forms, and suggested another, viz. that *Andricus ostreus* Giraud was the complementary form of *Neuroterus aprilinus* Gir., but it has since been shown that *A. furunculus* Bjek. is the spring form of *ostreus*. He also bred *A. seminationis* Adler, *A. marginalis* Schl. and *A. albopunctatus* Schl. which he showed to have no alternating generations.

To the English translation Dr. Straton added an appendix on *Cynips kollari* Htg., which persists as an agamous insect.

Dr. Adler's experiments enabled him to discover six fresh species, such as *Andricus gemmatus* Adler, *A. pilosus* Adler, *A. cirratus* Adler, *A. malpighii* Adler, *A. nudus* Adler and *Diplolepis similis* Adler.

All the forty-two flies he deals with occur in Britain, and in addition we have a further thirty or so that were not included in the original German work. Some of these have since been linked up by Continental workers and some by members of the London Natural History Society, but there is still much to be checked up and to be found out about the various species.

With this object in view I have been sleeving from time to time some of the species of flies on young plants of *Quercus robur* Linn. in my garden, and I have from these obtained some results confirming Dr. Adler's work.

Last year five species were sleeved on different branches, but the tree selected for four of these experiments was badly affected by the drought and I obtained no results from three of my attempts. The other, where flies of *Andricus amenti* Gir. were sleeved, has furnished me with a number of galls of *A. glandulae* Schenck, thus adding one more coupling to the list of British species.

Mr. J. Ross, from his observation of the frequency of the galls of these two flies in a woodland in Kent where *Quercus sessiliflora* Salisb. is the prevailing species of Oak, had suggested that these two forms might be complementary to each other, as has now been proved. Mr. M. Niblett had also found *A. glandulae* on a tree in his garden where he had turned out some flies of *A. amenti*, thus leading him to the same conclusion.

The fifth experiment tried with flies of *Neuroterus schlechtendali* Mayr has so far disclosed nothing. Mr. Ross has given attention to this species and has bred the insect. He has pointed out that errors of drawing have apparently been made in the illustrations of the gall in some Continental compilations, and that the figures which have been represented as copied from Mayr are essentially different from Mayr's original drawing. The illustration accompanying the article by the late E. A. Fitch in the *Entomologist*, July, 1878, No. 182, 11 : 145, is an adequate reproduction of Mayr's original.

If, as Continental authorities claim, this fly is the agamic generation of *N. aprilinus* Gir. no result can be anticipated until the following spring. The linking of these two species would mean a big deviation from the usual cycle of alternating generations in the British species of the genus *Neuroterus*, but the galls of *aprilinus* and *schlechtendali* appear to occur in the same areas with regularity. The flies of *aprilinus* emerge in April or early May, while the galls of *schlechtendali* appear on the catkins in May, the flies emerging in July, August and September, or sometimes lying over for a year.

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ARCTIC BUTTERFLIES.—With reference to the article by Mr. Haig Thomas under this title, published in the January *Entomologist*, I should like to offer the following observations: It is not quite correct to say that *Oeneis bore* is not known to occur in Swedish Lapland. In 1912 (*Entom.*, 45 : 68) I recorded taking two specimens of an *Oeneis* at Abisko comparing exactly with this species as described in Kane and Lang and identical with specimens of *O. bore* in the National Collection labelled "Sydvaranga". I understand *Pyrgus centaureae* is in Scandinavia confined to southern Norway and Sweden, and that its place in the Arctic region is taken by the recently described and nearly allied *P. freija* Warren. I have half-a-dozen specimens taken at Abisko in 1911 that, until Mr. Warren saw them some years later, were considered by me to be *centaureae*. He at once named them *P. freija*. They are quite distinct from my *centaureae* taken in south Scandinavia. There is, of course, no question of the correctness of Mr. Warren's determination.—W. G. SHELDON; West Watch, Oxted, Surrey, December 23rd, 1937.

POLYGONIA C-ALBUM AND LIMENITIS CAMILLA IN SOUTHEAST DISTRICT.—Four years ago the first *Polygonia c-album* were seen in this district. The numbers have increased each year, and in 1937 we had quite a fair number. Also in 1936 the first *Limenitis camilla* were seen, about six in number. In 1937 one or two dozen were reported. So it looks as though these two species had definitely spread eastward to the coast and were now firmly established.—A. F. COMMON; 316, London Road, Westcliff-on-Sea.

A NEW MELITEID BUTTERFLY FROM ASIA.

BY L. G. HIGGINS.

Melitaea roses, sp. nov.

♂. The ground-colour of the upper surface is brilliant orange-red. On the fore wing the markings closely resemble those of *didyma*. The submarginal series is complete and the spots show little tendency to form lunules. On the hind wing there is a black basal suffusion, which terminates in a large round spot in cellule 1c, as in *ala*. The discal markings are barely indicated except for a small spot on the costal margin, and the submarginal series is wanting. On both wings the black marginal border is strongly marked. On the under-surface the markings closely resemble those of *didyma*. The orange submarginal fascia of the hind wings is usually broken into separate macules.

♀. On the suppler surface the markings of the fore wing are more complete. There is a slight tendency to dark suffusion, and the ground-colour is more distinctly reddish towards the outer margin, and paler towards the base. The hind wing is bright orange-red, only marked by the black basal suffusion and the wide marginal border. On the under-surface the markings are similar to those of the male.

Exp. alar. 40-48 mm.

The male genitalia are remarkable for the development of the ring wall, which is produced backwards as a wide shelf, which is characteristic.

Locality.—Kasakstan, Aulie Ata, Talas Alatau, 2500 m., July. 3 ♂♂, 3 ♀♀.

Holotype ♂ and allotype ♀ are in the collection of the British Museum.

This species, which is closely allied to *M. ala* Stgr. and to *M. chitralensis* Moore, can be distinguished from *M. didyma turkestanica* by the wide marginal border on both wings and the absence of the submarginal spots on the hind wing. It should not be confused with *ala* in which the under surface is quite differently marked.

Linkwood,
Woking.

PIERIS RAPAE A CANNIBAL.—In August last I placed in a small box a number of larvae of this species together with ova of *P. brassicae* and when examining them a couple of days later found that several *brassicae* larvae had hatched and that three were being devoured by *rapae* larvae. This was in spite of the fact that the cabbage-leaves which I had enclosed were still fresh.—A. A. W. BUCKSTONE; 90, Pams Way, Ewell, Surrey.

CATOCALA FRAXINI, L.: A NEW BRITISH RECORD OF CAPTURE AND BREEDING.

BY DR. E. A. COCKAYNE, C. N. HAWKINS, FRANK H. LEES,
SIR BECKWITH WHITEHOUSE AND DR. HAROLD B. WILLIAMS.

PART 3. BY PROF. SIR BECKWITH WHITEHOUSE.

(Continued from p. 17.)

The first imago, a male, emerged on August 20th, 48 days after the larva had commenced to spin its cocoon. From this date emergence continued regularly until September 22nd when the 25th and last pupa hatched. The actual dates of emergence are as follows :

August 20th	.	.	10-11 p.m.	.	♂.
„ 23rd	.	.	9.15 „	.	2 ♂♂.
„ 25th	.	.	10 p.m.	.	2 ♂♂.
„ 26th	.	.	11 „	.	♀.
„ 27th	.	.	..	.	♂.
„ 28th	.	.	..	.	3 ♂♂, 2 ♀♀.
„ 30th	.	.	..	.	2 ♂♂, 2 ♀♀.
September 1st	.	.	..	.	♀.
„ 2nd	.	.	10 p.m.	.	♂.
„ 3rd	.	.	10.30 p.m.	.	♂.
„ 6th	.	.	10.30 „	.	♀.
„ 10th	.	.	10.30 „	.	♂.
„ 15th	.	.	9.30 „	.	♂, ♀.
„ 16th	.	.	10.30 „	.	♀.
„ 22nd	.	.	10 p.m.	.	♀.

It is interesting to note that all the imagines are very fine perfect insects of fair size. No "cripples" appeared. Emergence always occurred at night, usually about 10.30 p.m. In fact, during this interesting period, it was my custom to visit the breeding-cage nightly between 10 and 11 p.m. and on several occasions I had the interesting experience of witnessing this beautiful insect emerge from its cocoon, immediately run up a branch and select a horizontal twig for the full development of its wings, a process which occupied from 20-30 minutes. After the wings were dry, the moth always left its perch, dropped quickly to the floor of the cage and then assumed its normal resting attitude with wings flattened on the side of the breeding-cage. Here I found it wise to leave it until morning, as, during the hours of darkness, the insect is extremely skittish and most difficult to place in a killing-bottle, however large !

The insects comprising this series have been labelled in

accordance with the type adopted by Mr. Hawkins, and continue the serial numbers from 49 onwards to 73.

The insects which emerged on September 10th, 15th and 16th, *i. e.* 2 pairs, were sacrificed for breeding purposes, unfortunately without success. This is the more remarkable to me since, in the case of the moths bred from the Horsham stock in 1909, no difficulty whatsoever was experienced in obtaining a pairing. At that time I was residing in the very centre of Birmingham, without any real facilities for breeding insects. The cocoons were simply placed in large cardboard boxes—hat-boxes, in fact—where emergence occurred, and pairing took place. On the present occasion every device was adopted to make the insects pair, and apparently without success. They were placed in large roomy and airy cages, both indoors and out-of-doors; they were fed regularly with honey, and kept alive for 17–21 days; they were visited at all hours during the night to ascertain whether copulation had occurred, but in spite of all precautions the result was failure. It is true that the two females laid eggs in large numbers, but examination of these by Mr. Hawkins and Dr. Cockayne confirmed them in their view that they were infertile. None of these eggs ever hatched.

Of the imagines obtained in the series of 25 that it has been my privilege to breed, 6 are of the suffused type, 5 very light in colouration, and the remainder (14) intermediate.

In conclusion, my very sincere thanks are due to Mr. Hawkins and Dr. Cockayne for so kindly placing this valuable material at my disposal. My only regret is that the final result, *viz.* 25 imagines bred from 53 ova hatched, is so mediocre—a result which *may* have been due to over-solicitude on my part, but partly also to the difficulty attached to feeding a voracious larva upon food which is difficult to maintain fresh. This leads to depletion of water in the larva. In my previous experience the larvae were kept in closed boxes throughout, which kept the food-plant fresh and juicy. *C. fraxini* is a species which is not easy to breed in captivity for this reason. It is essentially a species to be “sleeved” upon the living tree, when no serious difficulty need be anticipated, as proved by the excellent results obtained by Mr. Frank Lees.

PART 4. BY FRANK H. LEES.

On October 9th I received from Mr. Hawkins 102 ova of *Catocala fraxini* laid by the captured female whose history he has given us. A timely warning of possible too early hatching unless kept very cool suggested special precautions to guard against that possibility.

Having obtained 2 slips of glass approximately $3\frac{1}{2}$ in. long by

$\frac{1}{2}$ in. wide I lightly wound the pieces of muslin on which the eggs were laid around them securing the corners with bits of strapping. Then I placed them in 2 tumbler-shaped glass jam-jars about $4\frac{1}{2}$ in. deep and 3 in. diameter at top, covering one with a glass lid and the other with a disc of perforated zinc covered with fine muslin. A few odd bits and loose eggs I placed on dry blotting-paper in a shallow 3 in. glass-top box. I then placed jars and box on tiles in the narrow opening of a small lattice window facing north in a shed with an ever-open door on the north side of the house.

I cut branches of poplar in April and kept them indoors in readiness for an early start. I had them in leaf at beginning of May. However, the month wore on and my only anxiety centered around the long delay in hatching. When I heard from Sir Beckwith Whitehouse that his had started on the 14th, I felt a little perturbed and decided to redistribute the ova I had over half a dozen glass-top boxes, bring part indoors and put the rest in the summer arbour—a decidedly warmer spot than the shed. In both places the sun reached the ova for a short time in the early morning and late afternoon but they were well shaded during the greater part of the day. Two boxes got excessively hot on the afternoon of the 20th through the summer arbour being left with all windows and door closed with the sun full on it, though not shining on the boxes. Happily it did no harm. On May 20th 2 larvae were out in the morning followed by 6 more the same evening. When I came to round the larvae up to put them into their feeding quarters I was thankful I had the ova in so many boxes, for never have I had such swiftly moving, agile, elusive creatures to deal with, the moment the lid was off, so were they, and invariably in opposite directions. On the morning of the 21st only one more had hatched and the thermometer indicated so considerable a fall in temperature from the previous day that I had the fire on in my room to try to equalize matters. May 22nd brought 16 more larvae on the scene and during the 2 following days another 58, with 4 more (the last) the evening of the 25th.

I lost 2 larvae through their being unable to complete their escape from the egg; oddly enough in each case the same thing happened; a complete loop of the larva's body protruded from the opening, wedging head and hind quarters in the shell. By clumsy surgery I released one larva, but it died soon afterwards; the other I left to nature, and it was dead when I examined it a day or two later; the head was demonstrably bigger than the opening in the egg and the jaws were ineffective, the way the head was wedged, to enlarge the aperture.

Of the eggs that failed to hatch, 14 in all, 1 was shrunken and semi-transparent, probably infertile, the others were nearly equally

divided into 2 groups: (1) Those that never changed from their first dark colouring at all. These I sleeved out later, hoping they might hatch on the tree, but in vain. (2) Those in which a larva had formed and was unable to bite its way out; for a day or so, holding the egg up to the light, what I took to be the larval form was dimly visible, but gradually this shrank to a dark eccentric speck in an almost transparent shell.

The behaviour of the young larvae in their glass-top boxes (in which I had given them choice of Lombardy, small leaf hybrid and white poplar leaves) led me to lament in a note in my diary on May 22nd their lack of interest in the food provided and their persistence in racing madly round and then hanging limply from the glass top in entire disregard of the desirability of feeding. The fully 2-days-old larvae had, however, made just a feeble start at their business in life, and I could only hope that appetite would increase as mobility diminished.

On May 25th I found 1 larva dead. I did not think to note to which day's hatching this belonged though I believe it was one of the earlier ones; at any rate, observing that the leaf of white poplar to which it was attached had been eaten I discarded the idea of utilizing *Populus alba* as a food supply, in case it was the cause of the trouble.

With 81 living larvae to deal with I then proceeded to get them sleeved out without delay. I used 6 sleeves varying in size from 12 in. diameter with an effective length of about 20 in., to 6½ in. diameter by 15 in., distributing them as follows:

Sleeves A and B containing 20 and 16 larvae respectively on Lombardy poplar.

Sleeves C and D containing 20 and 10 larvae respectively on hybrid poplar.

Sleeves E and F containing 5 and 7 larvae respectively on aspen.

The aspen was only a small sapling and being easy of access I thought it best to keep it mainly in reserve for the further hatchings I still hoped for.

This left me with 3 larvae only in a glass-top box to keep under observation, which number was increased to 7 by those which hatched the same night (the 25th). Of these 7, one died on the 28th, and one I unfortunately dropped on the ground and lost on June 7th when I was transferring all but one to the sleeves on the aspen. This brought my total of sleeved larvae to 82. I noted that the larvae from the boxes were at least a full instar in front of the very few visible in the sleeves, and I think we may take it that night-feeding larvae are much retarded when night temperatures (as was the case that June) are persistently low.

(To be continued.)

ARGYNNIS PALES SCHFF. AND ALLIED SPECIES.

BY BRIGADIER-GENERAL B. H. COOKE, C.M.G., C.B.E., D.S.O.

FOR some time past, when collecting in the mountains of Austria and the Tyrol, I have found two different forms of the insect known as *Argynnis pales* flying together on the same ground. They are as follows :

(1) A small form of which the males have a dark brick-red underside to the hind wings which replaces or partly obliterates the yellow-colour of most other forms. The fore wings of the male are often narrow and pointed at the tip. The whitish or silvery spots are much reduced in size. The corresponding females are more or less of the same reddish-brown colour as the males on the upper side, in some cases slightly paler, but I have taken none with a black suffusion.

This form I imagine to be what it is at present known as *palustris* Fruhst., though the underside of the male hindwings is often, in the Tyrol, of a far more uniform dark-red than the specimen taken by Higgins at Limone, and figured on Plate II of the *Entomologist* for 1930.

(2) A larger insect with broader and more rounded wings. On the underside of the male, the red markings of the hind wings are of a pale colour, blending with the yellow background, and reminding one generally, in a manner hard to explain, of the underside of the hind wings of *Argynnis euphrosyne*. The yellow patch enclosed by veins 3 and 4 is longer than in form (1). The underside of the fore wings has faint black markings which tend to disappear in some specimens. The tip of the fore wing has a pale yellow wash which spreads along the outer margin. The brown apical streak, usually sharp and conspicuous in *pales*, is faint and indistinct, and the short yellow streaks between veins 3 and 7 on the outer margin of *pales* are replaced by small yellow patches which in many cases extend to vein 1, and are sometimes scarcely visible.

The females are considerably larger as a rule than those of form (1). The hind wings on the underside have a greenish-appearance as opposed to the reddish tint of form (1), and the pale greenish-yellow tip to the fore wings is particularly noticeable, and spreads some way down the outer margin. These females, as far as I have been able to observe, invariably have a black or purple suffusion on the upperside, which varies in intensity. This form (2) agrees more or less with the insects in the British Museum labelled as *isis* Hb. In this connection the name ab. *napaea* for the dark females seems to be unnecessary, since these dark females are the normal females of *isis*.

Up to last year I had taken the two forms flying together in the Stelvio district and at Obergurgl in the Oetzthal, but the matter as far as I was concerned, was brought to a head in August, 1937, when Captain Manley and I were collecting on the Arlberg Pass (the dividing line between the Vorarlberg and Tyrol). Here a form was taken at between 5,300 and 6,750 feet altitude, both sexes of which are not unlike the insect named *palustris* in Plate II of the 1930 *Entomologist*. Flying with these at altitudes between 5,700 and 6,750 feet, on the same grassy hillsides, was a much larger insect (a large and distinctive form of (2) above), which was quite distinct in both sexes. The females were more-over all more or less suffused with black or dark purple. I took one pair of this latter form *in cop*.

It seems impossible that they can be two forms or subspecies of the same species, for among the considerable number taken we never discovered a single specimen of either sex which could be considered a transition between the two very different insects.*

Other points of interest have arisen as a result of my inquiries :

(a) On examining Esper's original description and illustrations of "*Papilio arsilache*" (published in 1780) I noticed that, of the two figures shown, the first (fig. 4 on the plate) which is described as "*N. Ph. Arsilache*" bears little resemblance to what is generally now known as *arsilache*. For one thing it has a white fringe, which is a characteristic of the higher flying *pales* races, and the underside of the hind wings has a considerable ground-colour of yellow. Esper describes the specimen, which he here figures, as having been taken in a district near Vienna. I collected for two years from Vienna, and the only spot on which I took any form of *pales* was on the Raxalpe, 60 kilometres as the crow flies south west of that city, at over 6,000 feet altitude. Captain Riley and I compared these Raxalpe specimens with Esper's plate, and we came to the conclusion that it was this form which Esper figured as *arsilache* (his figure 4). I know of no district nearer to Vienna where one would expect to find *pales*, nor did I ever discover "*arsilache*" in any of the lower-lying country round the city.

On the other hand Esper's second figure (fig. 5 on the plate) has brown fringes and a very red underside to the hind wings, as well as heavy black markings. It might quite well represent what we know as *arsilache*. The specimen here figured was taken on the

* I have examined the genitalia of these two forms, and am of the opinion that they are distinct species. This conclusion was also reached by Mr. Wheeler, assisted by an examination of the genitalia, when he was working on this group in the British Museum. The genitalia are very distinct. The small form would appear to be a race of *A. pales*; the large one, with the greenish female must be *Argynnis dirphya* Hoffmannsegg (1806) more generally known (incorrectly) as *A. pales* var. *isis* Hb.—N. D. RILEY.

Aisch River in northern Bavaria, and is described by him as being probably an aberration of, or separate species from, fig. 4. Fig. 5 is described on the plate as a variety of the male.

The original very vague description of *pales* by Denis and Schiffermüller (1775) is based on specimens from the Vienna district, presumably the Raxalpe, Schneeberg or Semmering. Hübner's figures of "*arsilache*", published in 1800, and Herrich-Schäffer's figures of the same insect, published in 1843, all appear to represent *pales* and not the insect at present generally called (wrongly) *arsilache*.

As long ago as 1871 Kirby (*Cat. Diurn. Lepid.*) recognized *arsilache* Esper (fig. 4). to be synonymous with *pales*, and treated Esper's fig. 5 as a variety of *pales*. In reality, of course, fig. 5, which represents the insect to which the name *arsilache* has been universally misapplied, was without a name until 1934, when it was named *Argynnis pales alethea* by Hemming (*Stylops*, 3 : 97).

(b) Professor Michael Hellweger in his publication *Die Grossschmetterlinge Nord-Tirol's* states that "*pales* var. *arsilache* [i.e. *alethea* Hemming] occurs on dry slopes of our Alpine heights, but only in a variable transition form". It seems possible that, since *alethea* is generally reported to be an exclusively marsh insect, he may be confusing it with the *palustris* of the Tyrol with the brick red underside. Hellweger also reports having taken a male *isis* in cop. with a dark female *napaea*, which is not surprising.

Last year on returning from abroad I tried to get some definite opinions from people who, I understand, are interested in studying this group, but met with no success whatever. The descriptions and figures of *pales* in its various forms are so incomplete and, in certain cases, contradictory, that it is high time the situation was cleared up as far as possible.

CELASTRINA ARGIOLUS IN NOTTS.—On April 25th, 1937, I saw a *Celastrina argiolus* at rest in an old ivy hedge not far from the large holly trees and holly hedge at Upton Hall. This is the second time I have seen this species here, the first occasion having been on July 21st, 1935, when one was seen in the garden of Upton Hall. Like *Catocala nupta* this species is given in Carr's *Invertebrate Fauna of Nottinghamshire* with some doubt, on the basis of an old record from Sherwood Forest only.—A. S. B. F. P. WYNNE; Upton House, Upton, nr. Newark, Notts.

ARICIA AGESTIS, PROBABLE THIRD BROOD.—At Dorking, Surrey, on October 4th I captured an individual of this species. The butterflies of the second brood were out on August 3rd and by the eighth of the month many were worn.—A. A. W. BUCKSTONE; 90, Pams Way, Ewell, Surrey.

NOTES AND OBSERVATIONS.

ABERRATION OF *LYCAENA PHLAEAS*.—Whilst collecting at Cark in Cartmel, North Lancashire, on September 2nd, 1937, I was successful in taking a fine silvery var. of *phlaeas* (*alba* Tutt). This is more interesting from the fact that it has the five spots of var. *caeruleopuncta* Staud. imposed upon it. The spots, however, do not appear so bright as when present in the copper form; possibly the contrast is not so extreme. On May 20th, 1936, I took at Witherslack a perfect dwarf form of *phlaeas* (var. *minor* Tutt) which only measures 21 mm. Tutt, in his *British Butterflies* (8:353) states that the smallest British specimen was one taken at Sandy, Bedfordshire, and this measured 21.9 mm. On the 22nd at the same place, I took another, 23 mm. This was devoid of the copper band on hind wings, only a small spot of copper being visible. During 1937 butterflies generally have been much scarcer than is usual with us, and I have seen few varieties. In early July I came across a small colony of *Aricia agestis* at Grange-over-Sands and took four var. *brunnescens* Harrison. One of them has only three spots in the series on underside of fore wings, another four, and the others five each.—ALBERT E. WRIGHT; Brunleigh, Grange-over-Sands, December 30th, 1937.

POLYGONIA C-ALBUM: FOOD-PLANT.—In August last I had a number of larvae of this species and having no stinging-nettle handy gave them leaves of Victoria plum, which they eat readily, but as they did not appear to thrive well nettle was eventually substituted. Their feeding upon plum may be of interest in view of the fact that I have always failed to induce this insect to eat sloe, although some authors mention it as a food-plant.—A. A. W. BUCKSTONE; 90, Pams Way, Ewell, Surrey.

PTILOPHORA PLUMIGERA AT LIGHT IN 1937.—I think it might be of interest to report my experiences with this elusive insect during the early part of November of last year. On the 3rd I heard that two males of this species had turned up at car headlights two days previously in the Ashford area of Kent. On the following Saturday, the 6th, I motored to this locality, reaching the ground at dusk. The spot on the edge of a wood was well sheltered from the prevailing east wind. The night was cool and cloudless. We used lamps and headlights which did not attract anything till just after 7 p.m. when a male *P. plumigera* was found at rest on the sheet of Mr. Peyton, while another appeared twenty minutes later. There was then an interval till 8.30 before a further Prominent flew to my light just as we were packing up. With this fairly successful start I considered it worth while trying again in this spot the following night, the 7th. On this occasion I was alone, reaching the locality at 6.30. Conditions were much better, a higher temperature with a cloudy sky.

No sooner had I pitched my light than a Prominent fluttered up. No other appeared till 7.30, when from this hour onwards males kept coming at short intervals right up till 10 p.m., when I had taken a total of a dozen, all in bred condition. Other species were quite numerous, including *Poecilocampa populi* and *Himera pennaria*, two females of the former coming to the lamp. On investigation in the vicinity the only apparently suitable vegetation for *P. plumigera* larvae was some large sycamore trees.

As regards this insect in other parts of the country, it seems to have turned up in almost record numbers in several localities during this period. Some fifteen males were taken at light in mid-Kent between November 5th and 8th, while a friend of mine in the Cotswolds secured no less than thirty-five examples of *P. plumigera*, including three females, on the 8th under very rainy conditions between 8 and 11 p.m. In this instance there were also only sycamores in the neighbourhood. After this date very cold weather set in and no more of this Prominent were seen at light.—C. G. M. DE WORMS; Milton Park, Egham, December, 1937.

EUROIS OCCULTA BRED FROM THE EGG.—It is well known that this species which in nature passes the winter in the larval state, will when reared in captivity often produce a second brood in a year, unlike many of its relatives among the Brocade family. While at Rannoch this summer I took at sugar on July 23rd a rather worn female of the nearly black form. On the following day this insect deposited a large heap of several hundred ova which immediately started to colour up. I gave half of them away, the rest hatching on August 3rd. I kept the larvae at first in small tins, feeding them from start to finish on dandelion. After losing a good many in the earlier stages, a couple of dozen of the survivors went ahead and fed up rapidly. These were full-grown by the end of the month, all pupating by September 10th. The first imago appeared a month later on October 10th and the last one on November 8th. All the insects were slightly smaller than the normal wild examples. The full-fed larvae, however, were well up to size, being nearly three inches when fully extended. I still have a number of these from the same brood undergoing hibernation.—C. G. M. DE WORMS; Milton Park, Egham, December, 1937.

MORE RAVAGES OF CLOTHES MOTHS.—In recent years I have kept my breeding-cages in a garage, an arrangement that has some advantages, and one serious disadvantage of which I was at first unaware. It was a matter of mild interest to note that I was breeding among more attractive species of Lepidoptera a fine series of the American Clothes Moth (*Acompsia pseudospretella*), and at the same time it was disappointing to find that the majority of my most cherished pupae were not producing perfect insects, but I did not immediately connect the two phenomena. During one winter six pupae of *Chaerocampa elpenor* disappeared without leaving a vestige behind,

and in the following winter the same thing happened to a whole series of pupae of *Nyssia lapponaria* and *N. zonaria*. The total casualties in the year were about 150 pupae, and where they had been I found about 100 larvae of the Clothes Moth. Suspicion was turned to certainty when one of these larvae was seen to have made a hole in the head of a pupa of *Cucullia gnaphalii* and eaten up all the interior, while another had bored through a cocoon of *C. lychnilis* and was nourishing itself on the contents. To deal with the pest was no easy matter, for it was a mystery how the Clothes Moths ever got into the breeding-cages. They certainly could not get out once they were in, and it seems possible that they did not enter the cages from outside, but laid their eggs through the interstices of the perforated zinc. They showed a real talent for discovering which cages contained pupae, for an unoccupied cage rarely had in it any of their larvae. To make matters worse, although the moth is two-brooded, the larvae were at work throughout the year, their deprecations being fiercest about mid-summer and in the late autumn. I have tried the following methods :

(a) Leaving half of the cages unoccupied for about a year.

(b) Searching for and destroying the larvae at frequent intervals.

(c) Keeping pupae in small tin boxes until just before the time for emergence.

These methods have been in a measure successful, but to get at the root of the trouble it seems necessary either to persuade the Clothes Moths to lay their eggs somewhere else or to destroy the eggs before they hatch. The best course may be to put the breeding-cages in some place which is less popular with the Clothes Moths, or to attack the eggs with poison or boiling-water.—A. M. MORLEY ; 9, Radnor Park West, Folkestone, January 5th, 1938.

RECENT LITERATURE.

Man and the Termite. By HERBERT NOYES. Peter Davies. Price 8s. 6d.

This book will find no place for itself on the shelves of the systematist, but for that overworked conception the man in the street it certainly has its points. In his introduction the author enters a naïve disclaimer to the entomological usefulness of his book, and also apologizes for his humanizing of the insects and for his introduction of their own particular deity. Having thus cleared his ground like the patrons of Chaucer's Pardoner, Mr. Noyes proceeds to extract the very utmost from his self-granted licence.

Classification of the Order Isoptera, in so far as it is attempted at all, is worked out on a basis of human virtues and vices. Thus *Termes natalensis* heads the list because of its skill in agronomy, for it

cultivates edible fungi, and *Hamitermes perplexus* comes at or near the other extremity because this species is said to keep a sort of prison in its termitary where the maimed and aged are confined. It is an undoubted fact that the classification of this Order is not without its problems, but the author has made the most of them by confusing together all the different systems of nomenclature that have been current during the present century, and then sarcastically referring to the divergence of opinion of the "pundits". On the other hand, when it comes to deal with the life and work of the Termite the book is exceedingly interesting and informative, being as it obviously is the outcome of many years of personal acquaintance with the Termite all over the world. Much is done to intrigue the curiosity of the reader, and he is left with a host of unanswered problems, each more fascinating than the last. Curiously enough, little practical mention is made of the millions of pounds worth of damage perpetrated annually by the Termite. One feels that the author is too fond of his subject to give away much of their vice; in fact he almost tries to make more of their nearly non-existent virtues, particularly in connection with the fertile silt of the Nile, which he attributes to the work of Termites.

All through the book man is compared with the Termite to his own detriment, and many are the overt digs aimed at the social system by contrasting it with the perfection of the Termitary system, but in spite of these profitless side-tracks *Man and the Termite* comprises at heart the results of much honest and enthusiastic field work, for which a good deal may be forgiven.

Los Procris de Espana. By R. AGENJO. *Rev. Espan. Ent.*, 1937, 12: 283-322.

The author is to be congratulated on the production of this clearly written and well-illustrated paper published in Madrid in the turmoil of civil war. He begins by pointing out that the strong superficial resemblance between the various species and the occurrence of three parallel colour forms, green, blue-green and bronze-green, in most of them have led to innumerable mistakes in identification in the past. He shows in a series of excellent plates that both the male and female genitalia afford simple and reliable means of distinguishing the different species. In his paper, devoted to the Spanish members of the genus, he describes a new species, *bolivari*, rehabilitates *soror* Rambur, and claims to have established that *globulariae* Hb., and *notata* Zell., are the same species. He finds no evidence that *manni* Ld., occurs in Spain, but says that *statices* L., is widely distributed. In the case of each species the geographical distribution in the Peninsula is given as far as possible.

The part most interesting to British readers deals with *geryon*, *statices*, and our third native species, which is called *globulariae* Hb., in all our standard works, and *cognata* H.-S., by Jordan in *Seitz*. There are two species, which fly together in many parts of Germany. The one, which also occurs in Britain, has a long spine on the external

border of the paramere, a stout aedaeagus with no cornutus, and a brown larva. The other has no spine on the paramere, and its aedaeagus is long and slender, with a thin cornutus running throughout its length. Its larva is green, and was figured by Buckler mistakenly as that of the former species, our Scarce Forester.

Jordan, in *Seitz*, considers that the species with no spine should be called *globularise* Hb., and regards *notata* Zell., as a subspecies of it. Agenjo has examined material from Syracuse, the locality from which *notata* originally came, and finds it identical with *globulariae*, as determined by Jordan. Alberti, who is also working on this genus, thinks that *globulariae* should be reinstated as the name for our Scarce Forester, thus leaving *notata* Zell., as the name for the species with no spine. Both Agenjo and Alberti agree that *cognata* Rambur (1840), is a distinct species, occurring in Spain and other parts of Southern Europe, and their figures of its genitalia are alike. They conclude that *cognata* H.-S. (1851-2), is preoccupied, and cannot be used for the British species. Jordan does not mention *cognata* Rambur. In the author's opinion our Scarce Forester, with the spine on the paramere, is left nameless, since *cognata* H.-S., is preoccupied and *globulariae* Hb., belongs to the spineless species, and he gives it the new name of *acanthophora*. Thus our Scarce Forester is *cognata* H.-S., according to Jordan, *globulariae* Hb., according to Alberti, and *acanthophora* Agenjo, according to the author of this paper. The question is solely one of nomenclature. Had the specimen from Heidenheim, which Hübner named *globulariae*, a spine on the paramere or no spine? If this cannot be decided by examination of the type, the sooner a ruling is given by the International Committee the better, for until this is done there will be hopeless confusion.

The section on *statices* should be read by those who still believe that there is no variation in the structure of genitalia. The aedeagus, which is large and curved, has a large cornutus at the proximal end, and it may be straight, curved, or doubly curved. In 80% of Spanish specimens there is in addition a small cornutus at the distal end, a much higher percentage than the author has found in examples from other parts of Europe. Alberti has found similar variation in his new species *alpina*, 6 out of 21 having a small distal cornutus as well as the large one. *Chrysocephala* Nickerl., usually regarded as a form of *geryon*, is thought to be *alpina* by Alberti. As our British *geryon* are said to be *chrysocephala* on their antennal characters, and as *chrysocephala* appears to occur in the mountains of Spain, the genitalia of specimens from these localities need further investigation.

E. A. COCKAYNE.

Recent Advances in Entomology. By A. D. IMMS. Second edition. London: J. & A. Churchill, 1937. Pp. x + 452. 94 text-figures. Price 15s.

The first edition of this invaluable work was noticed in 1931 (*Entom.*, 64: 141). The second edition is larger by 60 pages, has

11 more illustrations and costs 2s. 6d. more. Recent research accounts for most of the additional matter, but the whole text has been heavily revised as well. The discussion on the male genitalia has been simplified by the elimination of the morphology of the gonapophyses. To the chapter on metamorphism has been added a very full account of the work of Wigglesworth and others on the relations of hormones to moulting and the maturing of the gonads. The many recent discoveries in the fossil record of insects has necessitated a very considerable overhaul of this subject in order to take account of the work of Tillyard and Carpenter in particular. Insect vision, too, receives more extended treatment, and a section on general stimulatory organs has been added. Little has been added to the chapter on coloration; but in those on ecology considerable changes and additions have been made, notably in respect of lethal low temperatures, and the influence of humidity and the carriage of insects by air-currents. In the chapters on the practical application of ecology little change has been made, except in respect of the discussions of biological races and of experimental work connected with the locust problem. Such a bald statement as the foregoing, however, gives but a poor indication of the amount of work which has been put into this new edition and has brought it right up to date.

N. D. R.

SOCIETIES.

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—October 6th, 1937.
—Mr. R. Tait, President in the Chair. The syllabus for the monthly meetings, November to April, was fixed up as far as possible. The President gave a short report on the two Field Meetings, and whilst the Delamere excursion was only poorly attended, the outing to Chat Moss at the end of August was quite successful, and as usual good results were obtained by beating. It was decided that Mr. J. H. Watson should be made an honorary member of the Society. This being the Annual Exhibition Meeting, a good show was made by many of the members, the following gentlemen exhibiting: W. Buckley, from North Wales: *Graphiphora castanea* Esp., *Graphiphora agathina* Dup., *Agrotis ashworthii* Doubl., *Hydriomena caesiata* Lang., *Selidosema repandata* L., *S. gemmaria* Brahm, and *Plebejus argus* L., all being bred specimens except the last-named; also, bred from Chat Moss, *Acronycta leporina* L., *Notodonta dromedarius* L., *Biston betularius* L., *Gonodontis bidentata* Clerck, *Euclidia mi* Clerck. H. Britten, the ichneumon-fly *Protichneumon laminatorius* F. bred ex *Deilephila elpenor* Linn., and new to Lancashire and Cheshire. A. E. Tonge, from North Wales: *Ochlodes venata* Bremer and Grey; from the Lancashire coast a nice series of *Polyommatus icarus* Rott.

females; from the Wilmslow district, *Eriogaster rubi* L. H. N. Michaelis, the type speckled form of *Biston betularius* L. from Delamere. T. H. Hanson, a very fine bred series of the yellow form of *Pieris napi* L., including a partial third brood. C. H. Frost, *Apocheima pedaria* F., taken January, 1937, at Alderley. J. E. Cope, a selection of Coleoptera taken at Colwyn Bay and Ashton Moss. B. H. Crabtree, butterflies taken in the New Forest during July, 1937, viz., *Pararge aegeria* L., *Eumenis semele* L., *Maniola tithonus* L., *Aphantopus hyperantus* L., *Argynnis paphia* L., *Limenitis camilla* L., *Thecla quercus* L., *Gonepteryx rhamni* L., *Adopoea sylvestris* Poda. R. Tait, from the Witherslack district: *Erebia epiphron* Knoch, *Coenonympha tullia* Müller, *Aricia agestis* Schiff., *Diacrisia russula* L., *Melanchra nebulosa* Hufn., *Thyatira fatis* L., *Pterostoma palpina* L., *Ptychopoda muricata* Hufn., *Pylarge fumata* Steph., *Semiothisa alternaria* Hb., *S. liturata* Cl., *Crocota strigillaria* Hb.

November 3rd, 1937.—Mr. R. Tait, President, in the Chair. A copy of the *Proceedings of the Zurich International Entomological Congress*, 1925, was presented to the library by Mr. J. H. Watson. A paper was read by Mr. G. S. Kloet, An Entomologist's Notes for 1937. This paper largely dealt with Coleoptera, and Mr. Kloet had much to say in praise of Fairbourne, Merionethshire, which produced besides a large number of species, also in most cases a large number of specimens of each. Amongst these may be mentioned *Ceratophyus typhoeus* L., *Geotrupes stercorosus* Scrib., *Phyllopertha horticola* L., *Anomala aenea* De G., *Hoplia philanthus* Fuess., *Lampyrus noctiluca* L., *Broscus cephalotes* L., *Cassida viridis* L., *Oedemera nobilis* Scop., *Leptura maculata* Poda, *Clytus arietis* L., etc.; also the moth *Cucullia umbratica* L. Mr. Kloet showed further beetles from Delamere, including *Hylobius abietis* L., *Xylodrepa quadripunctata* Sch., *Melanotus rufipes* Hbst. Then, from the Cardiff district, Mr. Kloet, besides showing further Coleoptera, had 13 different species of Odonata, including *Libellula quadrimaculata* L., *Libellula depressa* L., *Agrion virgo* L., and *Agrion splendens* Harris. Other members exhibited as follows: A. E. Tonge, bred from Chat Moss, *Acronycta leporina* L., *Notodonta dromedarius* L., *Drymonia dictaeoides* Esp., *Odontosis camelina* L., *Biston betularius* L. Out of 46 specimens of *B. betularius* L. bred, 2 were the speckled type form, and all the rest the black form. H. N. Michaelis, from Wilmslow, *Diloba caeruleocephala* L. and two aberrations of *Bupalus atomarius* L. T. H. Hanson, from Delamere: a nice bred series of *Triphaena fimbria* L. G. C. Bartindale, a selection of Coleoptera, taken 1937, showing 41 additional species to his list for the Macclesfield district. Dr. J. Hope, aberrations of *Lysandra coridon* Poda from Dorset. H. Britten, species of *Apanteles* (Parasitic Hymenoptera) from Lepidoptera, viz. *A. tetricus* Reinh., Lancs coast; *A. zygaenarum* Marsh ex *Z. filipendulae* L., *A. popularis* Hal. ex *Tyria jacobaeae* L., *A. xanthostigma* Hal., *A. gonopterygis* Marsh ex *G. rhamni* L. L. Nathan, a short series of *Phragmatobia fuliginosa* L. bred August, 1937, from the Mytholmroyd district.—L. NATHAN, Asst. Hon. Secretary.

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THE LIFE STORY OF *APATURA IRIS*.

BY STANLEY MORRIS.

"Give me health and a day and I will make the pomp of Emperors ridiculous."

—Emerson.

THE following notes are the outcome of twelve years' study of this handsome insect, in its native haunts in a southern county. These studies have been carried out in company with a companion who was fortunate enough to reside "in medias res", and had only to step outside his door to make the insect's acquaintance. I am indebted to him for many of the notes referred to and for facilities for observation, of which, but for his assistance, I could not, in the limited time at my disposal, have availed myself. The localities must necessarily not be divulged, but I am giving away no secrets when I state that its range in the county is a wide one, and that of late years the insect has been considerably on the increase.

These observations have been made entirely by search work. The beating-tray has not been resorted to. It is not a scientific weapon, and wasteful at the best of times. Further, its use would have defeated the end we had in view, namely, to study the economy of the insect and to learn its habits at all seasons. This search work has proved one of the most fascinating pursuits I know, and, by reason of the nature of the country to be traversed, one of the most strenuous. It has, further, the advantage that it can be pursued all the year round, so that there is always some incentive to take one out into the woodlands, even in the depth of winter.

THE EGG.

Ova are usually deposited on the outermost branches of the tree, at a height of from 4 to 7 ft. from the ground, and on the shady side, preferably N.E. This situation is normal, but must not be taken as constant; when the undergrowth is at all dense the position for depositing is correlated with the existence of a suitable dropping-place for the insect to gain access to the tree.

Occasionally, for lack of trees of more suitable growth, tall *sallows* may be chosen, and in such case these are invariably shaded from direct sunlight by surrounding growth, such as growing timber, yet at such distance from the shielding tree that the selected site is well clear of overhanging branches and the possibility of drip therefrom.

In the dry summer of 1933 the ova were almost invariably deposited very low down on the tree, sometimes not more than a

foot from the ground and well in under cover of overhanging foliage. The reason for this was apparent later in the year, when much of the upper foliage of the trees was quite dried up and sapless, whereas that on the lower portions, shielded from the scorching effect of the sun's rays and from drying winds, was comparatively green.

In 1934 the insect developed a marked tendency to deposit on the S. or S.W. side of the tree—a procedure contrary to all previous experience, and one so remarkable that I find a note in my diary for that year: "Maybe we are to have an uncongenial spring, with low temperatures and little sunshine—one of those seasons with cold northerly winds, which persist until the turn of days and are a detriment to all growth and congeniality." Though I make no claim to forecast the weather, this, curiously enough, is what did happen. April was wet and cold, with moderate sunshine. May: persistent E. or N.E. winds and very fitful sunshine—very severe frost on 17th. completely blackening all young foliage. June: but for the last 10 days, a poor, wet, cold month. Generally a backward season, with little or no leaf on the willows until towards the end of April. The coincidence is remarkable to say the least of it.

Whatever the selection of the actual site for depositing, it may be taken as an axiom that the ovum is never exposed to direct sunlight, or in such a position that it is liable to drip from overhanging branches. Almost invariably a leaf is chosen which depends from the stem and hangs clear of foliage above.

Occasionally two ova are found on the same leaf, but such an occurrence is not common. These, I think, are the produce of different females, in that the ova, in such instances as have come to my notice, have been in different stages of development. This is indicated either by the absence of the purplish zone which encircles the ovum after it has been laid for some days, or by the degree of its intensity. Similarly, when more than two, or at most, three ova are found on the same tree, I think there is no doubt but that a second insect has deposited there. I have known as many as nineteen ova deposited on one tree, and in 1934, from ten to fifteen was of quite common occurrence. Obviously these were the product of several females, and significant of the fact that the trees were particularly suitable, by reason of their position and surroundings, for so many females to select them.

The upper surface of the leaf is always selected for depositing, and, generally speaking, the egg is placed about midway between the outer edge and the mid-rib, and slightly nearer the apex than the base of the leaf. In the broad-leaved types of willows the attitude adopted by the insect is across the leaf, somewhat diagonally; in the narrow-leaved types the insect faces the stem, and thus the ovum is deposited, as a rule, nearer the apex of the leaf

than is the case in the broad-leaved types. The actual position of the ovum, however, appears to be more regulated by the angle of dependence of the leaf itself at the time of depositing, rather than by any caprice of the insect, so that no hard and fast rule obtains. Ova laid actually on the edge of the leaf are not uncommonly met with.

Frohawke (*The Complete Book of British Butterflies*, p. 184) lays some stress upon the ovum being deposited upon the right side of the leaf. He says: "Out of 14 eggs found (laid wild) on one occasion, 11 were deposited upon the right side of the mid-rib, on the upper side of the leaf, and as usual near the outer edge; only 3 were laid on the left side of the leaf. I noticed the same with other eggs of *A. iris*: invariably the right side was chosen." I do not think that there is any significance in this further than that those eggs on the right side of the leaf were deposited by the insect at some time in the forenoon, while those on the left side of the leaf were laid later in the day. As previously stated, the eggs are never laid in such a position that they are exposed at any time to direct sunlight, and this being so, the insect's body would always be in the shade at the time of depositing. She would, however, as a natural sequence, face the sun during the act. If, then, this act were performed at any time prior to noon, when the sun is due south, she would necessarily face some point east by south, with the result that the egg would be deposited on that side of the leaf furthest away from the sun, i. e. on the right-hand side. Similarly, were the egg deposited at any time during the afternoon, the insect would face some point west by south, with the result that the egg would now be deposited on the left-hand side of the leaf, as being the point furthest from the sun at this hour.

Ova are deposited in the usual course from mid-July to mid-August—that is, over a period of roughly one month. In 1933 some females commenced depositing during the first week of July, and continued to deposit up to mid-August—a period of six weeks. In 1929 I found ova recently deposited as late as August 24th, but I have no reliable data as to the time that ova were first deposited in this year. The date, however, serves to mark the extreme range for depositing, that is, from the first week of July to August 24th, a period of eight weeks, although these dates would hardly be likely to apply to any one year.

The favourite tree is *Salix caprea* of not less than three years' growth, but when this tree is scarce or lacking, *Salix cinerea* or *Salix aurita* is chosen, and possibly other grey-stemmed varieties. The latter characteristic seems essential. I have never found ova deposited on either red- or yellow-stemmed varieties. These have a smooth, glossy surface to the branches, which does not appear to

be favoured by the insect, and neither the growth, nor the colour, lend themselves to camouflage during the larva's hibernating stage.

The female tree appears to be more favoured than the male. The reason for this is not clear, unless it be that the state of the forming bud at the time that the egg is deposited is some guide to the period of unfolding in the spring of the year. This is, perhaps, attributing to this insect a sense of foresight, which is quite foreign to our instinct, and yet, who shall determine that it is not so? Whereas reason is the basis of the determination of our needs in matters of this nature, so, in the meaner insect, may instinct supply the lack of reasoning power in a manner which is quite beyond our comprehension.

For a number of years prior to the hot summer of 1933 it was the practice to search only female trees, since the presence of larvae on the male tree was found to be of such rare occurrence that it was considered waste of time to examine them. Since 1933, however, the male tree has come more into favour—for what reason I know not. It is difficult to estimate the percentage of male trees favoured, as against female trees, but at a rough estimate I should put the proportion at 30 to 70. Even as late as 1934 a striking example of the female insect's partiality for the female tree came to my notice, which rather bears out my statement that the female tree is still the more favoured. Two trees stood side by side, of the same age and growth the one a male, the other a female. The foliage on both trees was excellent, and of a type particularly favoured by the insect. Both trees had the same aspect, open to the N.E., and the dropping point, for the purposes of oviposition, was equally favourable as regards both. On searching the trees I found two larvae on the female tree, but failed to find any on the male, though my search was equally thorough. Circumstances being so equal I cannot think that this choice was accidental.

In captivity the foliage of aspen and poplar are not refused, but I do not think that either tree is selected, in this country, for depositing in a state of nature.

When about to deposit, the insect flies boldly into the selected tree and spends some time in examining the inner branches. Here all her movements are very leisurely, as she drops from branch to branch, climbing first one and then another, and making a thorough inspection of her surroundings, until she has satisfied herself that the tree is one suitable in every way to accommodate the young larvae during the period of hibernation.

This done, she selects a suitable branch on the outside of the tree upon which to deposit, and then passes in the same leisurely manner to another site, never flying far at a time, and keeping, in preference, low through the undergrowth wherever a ride or suitable passage offers.

The number of ova deposited by a single female, as ascertained by dissection, may be from 130 to 160, and the period of depositing may extend from 10 days to a fortnight, or even longer, according to the state of the weather. Periods of bright sunshine are most essential, but the insect will deposit on still, warm days, when sunshine is lacking—and here a moist, humid temperature would seem to be the essential factor.

In captivity the ova may be deposited on the underside of the leaf, on the branches, or even on the muslin cover or its supports. but this diversion is due rather to stress of circumstances, and points to the fact that the selected tree is too exposed to direct sunlight. In a state of nature the upperside of the leaf is invariably selected.

The ovum is very small in comparison with the size of the insect, being only about 1 mm., measured vertically or transversely. It is conical in shape, with a somewhat flattish domed top, and having the base contracted to about the same diameter. It is of a pale green colour and vertically ribbed with fourteen prominent keels, running from crown to base. About the fifth day a dull purplish zone encircles it, around its widest diameter, and this deepens in colour up to about the eleventh day, when it gradually fades out. At the same time the head of the young larva shows dark beneath the shell, and on the fourteenth day the larva emerges through an opening made in the crown. The ovum is firmly cemented to the leaf with a glutinous substance, and its base, thus attached, remains in evidence on the surface of the leaf after the young larva has made a meal of the remainder of the shell. It is thus possible to determine the exact position in which the ovum was deposited by a close examination of the leaf upon which the young larva is feeding.

Infertile ova are not uncommon. These, when found, are quite empty and clear in colour, yet intact, with the exception that the ovum is broken beneath the crown, as though by the agency of expansion of gas within it— in short the egg would appear to have exploded. On one occasion which I have in mind, from the collection of eight ova from the same locality, no less than five proved to be infertile, while the remaining three hatched out normally. It is possible that these ova were the produce of more than one female, but I am inclined to think, from the choice of position, and the nature of the food-plant selected, that it is more likely they were all deposited by the same female but had escaped fertilization. This raises an interesting point— whether more than a single act of copulation is not necessary to fertilize the whole of the ova carried by a female insect. Unfortunately I have no evidence bearing upon this point.

(To be continued.)

**CATOCALA FRAXINI. L. : A NEW BRITISH RECORD OF
CAPTURE AND BREEDING.**

BY DR. E. A. COCKAYNE, C. N. HAWKINS, FRANK H. LEES,
SIR BECKWITH WHITEHOUSE AND DR. HAROLD B. WILLIAMS.

PART 4. BY FRANK H. LEES.

(Concluded from p 38)

The following day I left home for a fortnight's holiday, taking with me a single larva to keep under observation. Unfortunately, neither aspen nor Lombardy poplar was available in the neighbourhood but it did not seem to object to black poplar. A few days later it was resting preparatory to its next moult. It came through in apparently good order but never resumed feeding. I blamed the black poplar for its demise but in view of the experiences of Mr. Hawkins and Dr. Williams there was probably some more subtle reason. I think it may be useful to mention here that later on I had several apparently similar cases at the same and later moults in the sleeves on Lombardy poplar, though none in those on hybrid poplar and aspen: it would not appear therefore to be peculiar to indoor and cage-fed larvae.

On my return home on June 22nd the foliage in the sleeves showed little sign of larval activity and the very few larvae I could see were only about the size the deceased boxed one had been 10 days or so earlier. A spell of warm weather then had a stimulating effect, and on July 2nd I have a note in my diary to prepare fresh sleeves into which the larger larvae could be transferred.

The first 2 sleeves I went over were those on the Lombardy poplar in which the still considerable foliage remaining had gone decidedly "off colour". I found that the larvae had made very unequal progress, 6 were missing (presumably having died in infancy since I could find no corpses), and a few, recently moulted, had a sickly yellowish tinge which boded no good for their future.

I transferred them to 2 fresh branches on July 5th. The weather conditions made my work during the next 10 days both difficult and unpleasant, but with new sleeves fixed up on the aspen and hybrid poplar also, I transferred the larvae a few at a time as they completed their last larval moult, leaving the smaller ones to carry on in the old sleeves.

On July 15th I have the following notes on the position :

"*Aspen* : All but one larva through moult ; 3 very nearly full-fed ; 1 an instar behind, only just changed. All look very healthy.

"*Hybrid poplar* : Nearly all well on in last instar ; 1 only in previous instar is on point of moulting. All look very healthy.

"*Lombardy poplar* : Three only well advanced in last instar, a considerable proportion still in penultimate instar. Three dead or moribund, probably the sick one's noticed on July 5th. Rest look healthy."

As it seemed inadvisable to let the larvae spin up in the sleeves I then took stock of my cages. To one, an old wooden thing, pentagonal in shape, equal to about a square of 11 in. and about 19 in. high, I added on 2 sides a rough lining of virgin cork, in the interstices of which I imagined the larvae would spin up. I also put a few pieces of the same material into the second cage I considered suitable--a rectangular bird-cage affair (about 13 in. \times 10 in. \times 19 in. high) covered with strong leno which drew up at the top with a string.

But I had about 65 larvae to accommodate so that I next proceeded to prepare 4 11-in. flower pots (3 of which had metal rims at top to carry perforated zinc extension cylinders when desired), lining them this time with newspaper, acting upon a useful hint given me by Mr. Hawkins. With these flower pots it was easy to push the cut stems of poplar through the bottom hole into a large jam pot full of water on which the pot rested, and cover the top temporarily with a piece of plate-glass or perforated zinc. The fitting on of the perforated zinc cylinders was deferred until later when by thus bringing the total height up to 18 in. or so, I hoped to give the moths plenty of room when they emerged. The fourth pot merely acted as a reserve, such cocoons as were formed therein being cut away later and transferred to one of the others.

In the case of the 2 sleeves on aspen, I tried out the method I had employed previously with *Catocala nupta*. At the end of the sleeve I tied an 11-in. flower pot containing enough moss fibre to wedge some pieces of virgin cork and bark against the sides and a good supply of moss in the middle. My chief reason for this discrimination was a lurking fear that disaster might result from changing larvae from an open-air life such as these *fraxini* had been enjoying, to the confinement of a cage, which prompted me to risk the known dangers of pupation in sleeve or pot outside for a few, rather than face possible wholesale calamity.

Two larvae from the hybrid poplar began to spin up in one of the indoor pots on July 17th so that I had run things pretty close, too close as a matter of fact, as some of the aspen larvae had undoubtedly been ahead of them, so it was fairly certain that

some of the cocoons I afterwards found in the folds of the sleeves on the aspen were commenced before alternative accommodation had been provided.

Although I had not brought any larvae in on July 17th that were not in final instar, I was surprised to find myself with 10 larvae still feeding in the cages on the 26th and 5 out-of-doors, including one in penultimate instar that I regarded as a very doubtful finisher.

On that date the total spun up had reached the 50 mark, which number was increased by a further 9 by August 1st, when only 6 larvae remained. That day I detached the pots on the aspen sleeves and found more than half the pupae spun up either among leaves or in the folds of the sleeves. The former I detached and then cut the latter completely out, preferring to spoil the sleeves to disturbing the pupae. Those in the moss I thought it best to leave outside protected by a perforated zinc lid for the time being. Unfortunately I had several interruptions that day while carrying out these operations and somehow made a mistake when checking over the cocoons removed from one of the sleeves. The next day I discovered I was one short; I went back to the aspen and there sure enough was the cocoon still *in situ* in a bunch of leaves at end of an aspen branch which had sprung away and been hidden by adjacent foliage; but, a neat little hole at the top disclosing only a shrivelled larva skin at the far end, told clearly the story that a bird had got there first.

I accidentally hurt 2 larvae when changing food and 1 larva (not, I think, one of them) died on August 3rd. On August 4th I put the last 3 larvae, still far from full-fed, together into a fresh sleeve on the aspen. They looked sickly but were eating a little and I hoped the fresh air would restore them. Only one pupated, but, unfortunately, in a position where it was inevitably nearly squeezed flat the first windy day. I doubt though if it would ever have produced a perfect moth.

Before I pass on to refer briefly to the general arrangements I made for emergence, I think it is worth putting it on record that I think I can safely say that in every case but one (and that merely doubtful) the losses at the later stages had all been among larvae from the Lombardy poplar sleeves. I fear that the unaccountable discoloration of the leaves that I noted on July 2nd had a great deal to answer for, though as similar faded and black-tipped leaves were to be seen on many of the unsleeved branches too, I did not attach very much importance to it at the time.

A comment on the varying positions chosen for pupating quarters in my cages may be of some interest. I have noted 3 different positions: (a) sleeve folds, (b) leaves, (c) moss, among these on

the aspen. "(a)" approximates to the majority of Mr. Hawkins's, "(b)" to Sir Beckwith Whitehouse's, "(c)" to Dr. Williams's. In my large wooden cage the larvae drew leaves down on to the back as a rule, but a few went up into the detachable top (which I lined with paper, and spun up in the side folds, and one got between the bark and the side of cage into a corner easier for a larva to enter than for a moth to get out of. It wasn't visible at all till I was stripping the cage before putting it away, and then I knew why one moth emerged with a rather dissipated looking thorax. This same cage also revealed one dead pupa—a misshapen, sorry thing, probably one of the larvae I pinched so badly.

In no case did I remove a pupa from the cocoon though I was careful to see that there was no obstruction to easy emergence, trimming down leaves or paper folds as I thought desirable. Nearly all the pupae so far observed were in positions at varying angles from the vertical. In the large leno cage, however, the bunched-up folds of that material at the top were chosen by the majority in spite of the horizontal situation it provided and several others were in a similar position. 3 in the top angles and 1 on the floor under a fallen leaf. As there was only a small side door to this cage besides the "draw up" arrangement at the top, I took the precaution of cutting the leno top right out as it stood and remounting it in a wooden frame that I could lift on and off easily. A very little adjustment of the tighter folds and a few supporting strips of strapping enabled me to restore all to the same essential positions they had elected to occupy. I had no crippled or damaged moths in this cage at all so that it would appear that the moths do not insist on climbing higher if they find themselves high up already and with plenty of room below when they emerge.

On to the rims of my 3 11-in.-pot cages I fitted their extension cylinders of perforated zinc and distributed my transfers from the aspen sleeves and reserve flower-pot cage over these. I fixed the loose cocoons to the sides by bits of strapping, taking care to free the points of exit, and to place them in a position similar to their original one as far as I knew it. Cocoons in leaves included a very sketchy one by a disturbed larva, which dropped on the ground just before changing. I had to reinforce it with another leaf to prevent the pupa falling out. I should have done better to remove the pupa and place it in the moss I had put at the bottom of the pot. It produced, not surprisingly, a crippled moth later.

Two cocoons in the folds of the paper showed a dark stain at a point corresponding approximately to the under thoracic portion of the pupa; some injury before or during the change was visible on the pupa-cases at this point when I examined them after the moths (which were both crippled) had emerged.

When I came to consider what to do with 6 cocoons from the aspen spun in the moss I made a very stupid blunder. Anxious to avoid overcrowding I placed them, as they were, in a muslin cage 8 in. in diameter and about $8\frac{1}{2}$ in. high. The mass of moss reduced the head room by at least 2 in. Two moths emerged (on separate days), perfectly; the others all came out together (an utterly unlooked for happening), and partly owing to the cocoons being tangled together (I ought to have separated them) and the moss having hardened as it dried, and partly to the space and head room for the dispersal of 4 strenuous and excitable creatures being hopelessly inadequate (as Dr. Cockayne's and in fact all our observations clearly indicate), the scene in that cage in the early hours of Monday, August 31st, must have been reminiscent of the Kilkenny cats; at any rate, though all were strong and vigorous in body they presented an utterly woeful spectacle when I gazed upon them that morning, for which I cannot forgive myself. The pupa cases all appeared to be in good order, so that I don't think for a moment there was any other cause for the tragedy beyond the combination of circumstances I have detailed, for which my lack of judgment and care must be held solely responsible.

The following are the dates and details of emergence of the moths I set or used in my endeavour to obtain pairings to carry on the race: August 22nd, 1 male; 23rd, 1 male; 24th, 2 males (after this date I did not look in the cages till the following morning as I found the light disturbed the freshly-emerged moths and one had a wing slightly slit on the 24th after a display of resentment at my curiosity. I continued to date them as having emerged at night, however, though I suspected on a few occasions that emergence might have taken place after midnight); August 25th, 1 male; 26th, 1 female (also a hopelessly crippled female from a deformed pupa); August 27th, 5 males and 2 females (female No. 12 and male No. 13 kept for pairing); August 28th, 4 males and 2 females; 29th, 2 males and 2 females; 30th, 4 males and 5 females (male No. 31 and female No. 32 kept for pairing); 31st, 4 males and 3 females (also 2 crippled males and 2 crippled females from cocoons left in moss in small cage and 1 crippled female from an injured pupa); September 1st, 1 male and 1 female (also a crippled female from pupa in damaged cocoon from disturbed larva); 2nd, 3 females; 4th, 1 male and 1 female; 5th, 1 male and 1 female; 6th, 1 female (thorax damaged owing to awkward position of cocoon); 8th, 2 females (No. 50 having a slight curve inwards on the inner margin of right fore wing, a slight depression I had noticed on the pupa no doubt being the cause).

Of the 47 which I set, 5 had minor defects and 4 were very

slightly damaged in killing or setting. No. 50, already referred to, was the smallest by far, measuring (by the method Mr. Hawkins adopted) only a bare $3\frac{1}{8}$ in. The average size (by the same standard of measurement) I should put at rather under than over $3\frac{5}{8}$ in., even the largest did not exceed $3\frac{3}{4}$ in.

Five insects are of the dark scaled form described by Mr. Hawkins ; one of these having in addition an incomplete band of closer black scales which fade out before reaching the hind margin ; the roughly rectangular buff area comes approximately central and towards the diffused base of the band and naturally appears more than usually conspicuous. Mr. Hawkins's pale form is represented by 11 specimens including both the largest and the smallest insects I bred. The rest, though they show much variation, are all intermediates, as also were the 4 kept for pairing, which, of course, ruined themselves. My failure to get a pairing both surprised and disappointed me. My experience, however, was so like that of Mr. Hawkins that there can be no particular point in describing my unavailing efforts. The eggs laid were infertile and under 100 in number from the first female and less than half that from the second one. The "Kilkenny cats", too, lived together for a month making merry on sugar and blackberry jelly without producing any contribution to a future generation, though they served the useful purpose of inducing and maintaining a proper humility in their unhappy rearer.

In conclusion may I add that I think we were unfortunate in the season for the hatching and rearing of our brood ; the weather affected my sleeved larvae most ; but through the food, all must have reacted to it to some extent. Is it not possible too that the miserably damp conditions and low temperatures that prevailed almost throughout, and persisted more or less during the greater part of the period when we were trying to get our pairings, may not have contributed to our lack of success ? Having had much the same experience last year with two other species not reputed difficult to pair, I am, in the absence of any direct knowledge, disposed to suspect the one condition that was at any rate common to all.

Windy Gap.
Little Aston Park,
Streetly, Birmingham.

PHOTOGRAPHS WANTED. —(Can anyone tell me in what publication I can find a photograph, or an engraving, of Charles Janet, 1849–1932 ; Gustave Mayr, 1830–1908 ; Arnold Foerster, 1810–1884. European publications please copy. —HORACE DONISTHORPE.

MIGRATION RECORDS, 1937.

BY CAPT. T. DANNREUTHER, R.N.

THE following notes complete the 1937 series of observations as printed in the *Entomologist*, 70 : 92 3, 141, 176-80, 195 6, 200-2, 228 31 and 250 4. A general summary for the year follows :

(1) *Records of Insect Movement*, 1937.

(42) July 1st. *Pieris brassicae* : Just north of Bamburgh Castle, Northumberland, hundreds landed on the dunes on a front of 200 yards and " they seemed to be making south and west . . . for quite a number of days the place was swarming with them ; first-time I have seen anything like it " (W. Wannop.)

(43) July 18th. *Colias croceus* : At Sandown, Isle of Wight, in a S.W. gale before noon. 5 fresh specimens with 1 worn *M. stellatarum* were seen flying E.S.E. (E. H. Wild.)

(44) August 4th. *Pieris brassicae* : Under Beachy Head in half an hour before noon, about 50 in apparently good condition were flying north steadily in from sea with a light south wind. Sunny ; temperature 76° F. (H. C. Gunton.)

(45) August 7th. On Golf Links, Savernake Forest (Wilts), the following fresh specimens were noted, all flying west : 6 *Vanessa atalanta*, 1 *V. cardui* and 2 *M. stellatarum*. (H. C. C. Tufnell.)

(46) August 22nd. At Shanklin, Isle of Wight between noon and 1 p.m., in a calm and hot sun, the following insects arrived with other Nymphalidae, in small groups resting on the cliffs and flying S.W. : 14 *Vanessa cardui*, 7 *V. atalanta*, 9 *Colias croceus* and 6 *A. urticae*. (E. H. Wild.)

(47) October 3rd. *Vanessa atalanta* : Watching from the sea end of Tynemouth Pier for two hours, from 1.30 p.m., in a light N.N.E. wind with bright sun (temperature 65° F.), from 20 to 30 came in from sea, flying west. (G. L. Drury.)

(48) October 16th. *Colias croceus* : On the sea front at St. Leonards-on-Sea, where the species had been scarce, 2 were seen flying south in a light west wind on a sunny afternoon. (A. Belt.)

(49) At the Sunk Light Vessel, situated 10 miles S.E. of Felixstowe, on October 18th, at 6 p.m. in fog (temp. 60° F.), 4 *Phlogophora meticulosa* L. were seen flying to the south ; one captured. On October 29th at 6 a.m. 6 *Scoliopteryx libatrix* L. seen flying south in a light E.N.E. wind, temperature 50° F., one captured. On November 24th at 9 p.m. 1 *Cheimatobia brumata* L. settled near the light and was captured : Wind N.N.E., force 4, temperature 48° F. Captures identified by W. S. Gilles and found in good condition. (C. L. R. Turnor.)

(2) *Continental Records, 1937.*

(50) May 15th-20th. *Pieris brassicae*: Along the south shore of the Baltic between Kolberg and Swinemunde there was an enormous flight to the west over the Dievenov entrance between 10 a.m. and 7 p.m. in sunshine. They were flying slowly along the shore and across the river. (Erich Müller.) An exceptionally early migration.

(51) July 24th. *Pieris brassicae*: On the northern side of the Gross Glockner Pass (Austria) at 8000 ft. about 2.30 p.m., several thousands were observed descending the Pass covering a front of half a mile, all flying south. It is possible that they were escaping from a severe thunderstorm, which broke behind them at 4 p.m. with a high N.W. wind and heavy rain. (H. A. Pass. *Times*, November 5th.) E. T. Daniels reported "a huge migration" in Czechoslovakia in July, without details. (E. A. E.)

(52) August 20th. *Colias hyale*: On the Zanfleuron Glacier, near Sion, Switzerland, dozens in waves were flying north towards the Sanetsch Pass. Details in *Entomologist*, 70: 287. (C. H. Hutchinson.)

No migrant butterflies were recorded in Iceland in 1937 (*Entom.*, 70: 287).

(3) *General Summary, 1937.*

Up to December 10th, 1100 records have been collected as compared with 1280 in 1936. Of these, 80 refer to control insects and 100 are Continental records. In addition schedules of daily observation, kept by 33 observers for the first time, record little over a thousand migrants, as against two thousand control insects, but doubtless many insects therein were recorded twice or oftener. The schedules give valuable information as to the first and last appearance and the maximum numbers present in each brood, and also obviate the necessity for completing record cards for common migrant species not observed on a migratory flight. Although this system reduces the number of cards received, the reduction noted above is no doubt also due to a general scarcity or reduced range in some species as compared with recent years, as will be seen in detail in the following notes.

Vanessa cardui: First appearance, Lyme Regis, February 20th. About a dozen seen repeatedly in co. Cork, February 20th to April 24th. First 2 immigrants flying north at Scillies, March 26th. Last seen flying south, St. Leonards-on-Sea, November 3rd. L. W. Newman writes: "Saw a good number of *V. cardui* at Folkestone, June 6th, but I should not say a swarm; they were very worn (compare *Entom.*, 70: 178). 2000 larvae obtained there all died full grown and others had same experience this year." Although cards show the presence of about 550 in spring and 250 in autumn,

it was only between Ringwoud (E. Kent) and Eastbourne, at Dartmouth (Devon), Stroud (Glos) and co. Cork that more than a dozen were seen in the season. None at all was seen at Ashburton (Devon), Cardiff, Belfast and Edinburgh. Practically all remained south of lat. 52°—Harwich, Gloucester, Cork; but odd specimens reached Darlington (Durham) June 10th, and Alnmouth (Northumberland) September 9th. None recorded in Scotland, except in Isle of Rhum, where larvae were abundant (*Entom.*, 71 : 19).

Vanessa atalanta : 16 were recorded in winter months, nearly 200 in spring and about 450 in autumn. This is exclusive of "hundreds and hundreds" (one estimate was 20,000, *vide Entom.*, 70 : 178) which appeared at Brighton, June 5th, and were all gone by June 8th and never seen elsewhere. L. W. Newman writes from N. Kent, "I do not think I saw more than 6 or 7 in the spring and not a dozen in the autumn". Most county recorders had the same experience, but amongst observers who sent in schedules of daily observations the totals for this species were : at Hastings, 158; at Stroud (Glos), 84; and at Timoleague (Cork), 128; and nowhere else more than two dozen. One was first recorded flying north on May 23rd at Fritton Lake (Suffolk); last recorded flying south, 3 specimens at Peel (Isle of Man), on October 19th. Last appearances, November 4th at St. Leonards-on-Sea and East Grinstead. The range is shown by a single specimen seen at Edinburgh on October 6th flying south (P. W. Brown), and by a few specimens seen in the islands of Coll, Eigg and Rhum; but the species was exceptionally scarce in the Midlands this season.

Colias croceus : First seen at Bexhill. May 27th—a v. *helice* flying N.E. (H. D. Peile) and 8 others in the south in June. It was last seen flying north at Glengarriff (Cork) on October 2nd (J. E. Flynn), with no record farther north in Ireland. Last seen at Hastings and Offham (Kent) on November 4th, caught fresh. Early in August about 100 arrived in Hastings district flying N.N.W., and 2 dozen at Swanage also going north. Less than 150 were seen elsewhere this season. The daily schedules never accounted for more than 6 anywhere else and none north of Gogs Hills (Cambs.), June 7th. (E. R. Smith.)

Colias hyale : Probably absent. The only captures reported proved to be v. *helice*, and this may have been the case of one recorded as seen at Abbotsbury Hill (Dorset), July 30th, and 2 at Selsey Bill (Sussex), August 20th.

Acherontia atropos : 9 moths captured : Gloucester (June 17th, male and female); Sunderland (July 29th); Darlington (September 3rd); Hastings (September 12th); Grimsby Trawler (September 20th); Outer Dowsing Light Vessel (September 23rd); Harmston, near Lincoln (October 1st)—the only known record there (F. T.

Baker); and a worn male found dead in a bee-hive at Kilberry, Argyllshire, which gives the range. Ten larvae or pupae were found in Dorset, Sussex, Kent and Berks.

Herse convolvuli: 8 moths, of which 5 were captured: Kingsteignton (Devon), June 17th; Milford (Surrey), July 16th; Hastings, August 26th, fresh male; Timoleague (Cork), August 26th; Eastbourne, end of August and September 18th; Cromer, October 2nd, worn; and Sulby (Isle of Man), about October 10th (Thos. Garrett), being the first specimen captured recently in the Isle of Man, where the species is very rare.

Macroglossum stellatarum: About 150, well distributed. First appeared at Round Island (Scillies) on May 29th, flying N.N.E. in dozens; all gone next day. First appearance at Timoleague (Cork) June 22nd; at Douglas (Isle of Man), September 19th (first record since 1904); and a single record at Alnmouth (Northumberland) October 18th, suggests the range. Nearly all records are for the south coast. Last seen London October 20th—a male captured in South Kensington on Michaelmas daisy (E. W. Classey). 75 observations recorded in schedules.

Plusia gamma: Single specimens first appeared at Branton Burrows (N. Devon) on May 2nd, at Timoleague (Cork) on May 4th, at Hastings on May 17th, near Exmouth on May 19th, at Kelling Heath (N. Norfolk) on May 26th, at Wetwang (E. Yorks) on May 28th. It appeared first in dozens at Winchester on June 7th. A larva taken at Reading on mint emerged on June 9th, implying a very early arrival or possibly a winter survival (W. L. Rudland). It was first seen at Douglas, Isle of Man, on June 26th. It occurred sparingly in Durham on September 6th, and at Muckle Moss (Northumberland) on September 27th. A worn specimen was taken on ivy at Timoleague as late as November 7th, and one captured at Peel, Isle of Man, on November 3rd at light was released on the 12th. At Stroud (Glos) it was last seen on November 24th, when frost appeared: the Rodborough daily schedule accounted for nearly 700 in the season, but they were only common between September 24th and October 3rd, with a maximum of 70 on September 27th (T. B. Fletcher). In most places only occasional specimens were seen this season, and where the thousands observed emigrating at the Start Lighthouse (Devon) on the evening of August 28th (*Entom.*, 70: 229) bred is a mystery. Apart from this the cards only show the presence of about 750 and the schedules not many more than that, and these mostly in the south. There were no records from Scotland, where the species was abundant last year.

Nomophila noctuella Schiff.: Less than a dozen odd specimens recorded between June 12th, Wicken (Cambs.) and September 26th, Stroud (Glos), including a few at Dungeness and one in Suffolk.

CONTROL INSECTS.—Daily schedules exhibit, by a regularity of appearance, weather conditions locally suitable for migrants to be seen if present. *Aglaia urticae* began to appear from March 19th singly and in some places in dozens after April 12th. *Nymphalis io* did not appear in dozens until April 27th at Monkswood (Hunts). In April one reached Coll and, later, another was recorded at Barra (lat. 57° N.) which indicates the range (*Entom.*, 71 : 19). Schedules showed *A. urticae* generally twice as common as *N. io* except in Ireland, where the latter predominated, particularly in Belfast. In the Tyne district, where *N. io* had only been recorded twice in thirty years, it occurred in June at Washington (N. Durham), Birtley, Darlington, Sunderland, Alnmouth, Belfort and Holy Island, apparently travelling northwards in that order. In August specimens were seen at Wark-on-Tyne and Sunderland; in September it was at Corbridge, and by the end of the month several were reported in Renfrewshire.

Pieris brassicae : Due to extensive immigration the species was unusually abundant everywhere and became a pest in some places, though generally heavily parasitized. 1937 was a Cabbage White year. This westerly immigration extends as far as Pabbay in the Outer Hebrides.

Danaus plexippus : Four records. September 8th, a perfect female captured feeding on ragwort, flying east at the extreme point of Selsey Bill (T. Trought) (*Entom.*, 70 : 285); September 28th, one seen at Slapton (Devon) (H. O. Mills), and probably the same insect on valerian at Stoke Fleming nearby a little later (H. M. Churchward) (*Entom.*, 70 : 253); October 2nd, one seen at Harrow (K. Clarke) (*Entom.*, 70 : 246); October 2nd, a male captured at Lydney (Glos) settled on a flower (H. Angel) and presented to Gloucester Museum (*Entom.*, 70 : 249).

Argynnis lathonia : One flying north, seen on Brighton front on July 29th (R. C. Dyson). Only record for two years (*Entom.*, 69 : 230).

Nymphalis antiopa : Five records. September 4th, 1 settled on sea aster at Salthouse (N. Norfolk) (R. H. Higgins and E. C. Arnold). September 29th, 1 caught and released at Bagthorpe Hall (Norfolk) (H. N. Dugmore); September, 1 seen near Newent (Glos) (J. F. D. Frazer) (*Entom.*, 70 : 249); October 6th, 1 seen on *Ceratostigma* at Bognor (E. H. Tugwell, *Daily Telegraph*, November 10th); October 13th, 1 at Worthing (I. Spurgeon, *Countryside*, Winter, 1937).

Pontia daplidice : One flying north at Folkestone Warren (Kent), on August 15th, a male captured (G. Haley, identified by E. C. Joy) (*Entom.*, 70 : 227, 230).

Celerio galii Rott. : One captured coming in from sea at the Start Lighthouse (Devon) on August 3rd (A. W. Godfrey) (*Entom.*, 70 : 201).

Leucania l-album L. : A female taken at sugar near Paignton, September (P. P. Milman) (*Entom.*, 70 : 287).

Leucania vitellina Hübn. : Two taken at sugar in N. Cornwall, September 4th and 5th (A. Richardson); a fresh male taken at sugar at Dungeness, September 27th (B. Embry).

Laphygma exigua Hübn. : One taken in a light-trap on August 10th at Pirbright, Surrey (H. B. Lawson) (*Entom.*, 70 : 203); a fresh specimen taken at sugar at Dungeness on September 13th (B. Embry) (*Entom.*, 70 : 230).

Heliothis peltigera Schiff. : A fresh specimen captured at Minchinhampton (Glos) August 15th (A. Richardson); two dozen $\frac{3}{4}$ -in. larvae found feeding on *Senecio viscosa* on coast near Lydd (Kent) September 15th (B. Embry), identified by A. M. Morley, who also collected larvae there.

Catocala fraxini : One seen settled at Wood Green (London, N.) September 9th (C. O. Hammond); 1 taken at sugar in Ashford district September 12th (A. N. Brangham); 1 seen at Walton-on-Thames September 15th (F. L. H.) (*Entom.*, 70 : 278, 254 and 249, and *Entom. Bull.*, October, p. 97).

Cidaria obstipata Fabr. : A female taken at rest at Kenton (Devon), October 31st (D. S. Fletcher); another perfect female taken on ivy at Stanmore on November 7th (E. W. Classey) (*Entom.*, 70 : 285 G), also 1 seen in New Forest in autumn (W. Fassnidge).

Glyphodes unionalis Hübn. : A male in bred condition seen on a fence at Surbiton on October 31st (G. H. Heath) (*Entom.*, 70 : 286).

The estimates of district abundance supplied by recorders in their respective areas are tabulated on the same basis as for previous years and using the same symbols (see *Entom.*, January, 1935).

TABLE OF COMPARATIVE ESTIMATES OF ABUNDANCE IN 1937.

Species.	England and Wales.						Scotland	Ireland
	S W	S E	W.	E	N W	N E		
<i>Vanessa cardui</i>	FR -	C* -	R	R	R		<i>nil</i>	FR
<i>V. atalanta</i>	FR -	VC* -	R	FR	R -	FR -	R	FC
<i>Colias croceus</i>	FR -	C*	<i>nil</i> -	<i>nil</i> -	<i>nil</i> -	<i>nil</i>	<i>nil</i> -	R -
<i>C. hyale</i>	VR ?	<i>nil</i> ?	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>
<i>A. atropos</i>	R	R	<i>nil</i>	R	<i>nil</i>	R	R	<i>nil</i>
<i>H. convolvuli</i>	R	R	<i>nil</i>	R	VR	<i>nil</i>	<i>nil</i>	R
<i>M. stellatarum</i>	C*	R -	R	R	R	R	<i>nil</i>	R
<i>Plusia gamma</i>	VC* -	C* -	FC -	FC -	FR -	FR -	<i>nil</i> -	FR -
<i>N. noctuella</i>	R	R	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>
<i>A. urticae</i>	C -	C -	FC -	C +	FC	C	FR	FR
<i>Nymphalis io</i>	FC -	FC -	FR -	FC	FC	FR	VR +	FC

* Denotes only found very locally in such abundance.

Note.—The control insects, *Aglais urticae* and *Nymphalis io*, have been added from information contained in schedules of daily

observations recently brought into use to record the numbers of migrants present on fine days, which enables one to extract the date and number as a maximum for each brood as well as first and last appearance. Regular observers are invited to use these schedules, copies of which can be had from the Hon. Secretary of the Insect Immigration Committee, Capt. T. Dannreuther, R.N., "Windycroft", Hastings.

December 11th, 1937.

NOTES AND OBSERVATIONS.

UNRECORDED OCCURRENCE OF *PONTIA DAPLIDICE* IN NUMBERS.—I think it of sufficient interest to record what must be a unique occurrence of a swarm of *P. daplidice* in this country. My attention was recently called to this remarkable incident by the Rev. F. L. Blathwayte, after having seen the specimens captured by Mr. W. W. Collins, who has kindly given me the following particulars of his observation: "I captured the Bath Whites in 1906 at the latter end of July, or early in August, on the Dorset cliffs, west of Durdle Door, which is west of Lulworth Cove. I cannot tell the exact day, but I was in camp west of Lulworth, not far from the edge of the cliffs. I went off with my net one morning and saw what I took to be a large hatch out of *P. daplidice*; it is not possible to say how many—the best of my recollection a couple of hundred or probably more, as they were hovering about on the upper part of the cliff. I easily captured the four (2 ♂♂, 2 ♀♀) Mr. Blathwayte has seen." The occurrence suggests that an immigrant female in the spring laid its eggs in this particular spot and the resultant butterflies all emerged about the same time, and kept to the same part of the cliffs where the food-plant flourishes.—F. W. FROHAWK; February, 1938.

LEUCANIA CONIGERA.—The emergence of a perfect male *L. conigera* on December 14th, 1937, was a great surprise, as the pupa had been subjected to long night temperatures of barely 50° F. The pupae were reared from a few ova in a glass-topped tin kept in a cool fireless room. With better heating facilities a partial second brood should easily be bred. Perhaps *L. conigera* is partially double-brooded in warmer climes.—P. P. MILMAN; "Cyprina," 14, Lower Conway Road, Paignton, February 15th, 1938.

WHOLESALE SLAUGHTER.—For many years I have been keenly interested in entomology and in a small way a collector of British Lepidoptera. Each month I look forward to reading the *Entomologist* and the records there of other collectors, but it is frequently distressing to discover in these records the number of rare insects that are often quite needlessly destroyed. In the present number (February, 1938) one contributor, for example, mentions a friend of his in the Cotswolds who on one night took at light 35 examples of *Philophora*

plumigera. How unnecessary it seems that there should be this wholesale slaughter of rare insects! It serves no useful or scientific purpose, and surely such large series are quite unnecessary for the ordinary private collection. Could not some pressure be brought to bear to curb the acquisitive instincts of these unrestrained collectors? They give all entomologists a bad name, and it is naturally concluded that we are all tarred with the same brush, so that the very sight of an entomologist with a net is repulsive to many people.—(Rev.) WALTER L. FREER; Chute Vicarage, Andover, Hants.

[Many plans have been discussed at different times, to my knowledge, having as their objective the restraint of the over-zealous collector, but none has ever proved practical. There is no doubt that the vast majority of entomologists strongly disapprove of reckless collecting, and this "public opinion" has already had some effect. On the other hand, it may well be that at times what appears to be needless slaughter has little if any harmful effect upon the species collected. We know too little about the causes of fluctuations in insect populations to be able to dogmatize.—ED.]

ENTOMOLOGY AND CRIME.—The recent case of a gentleman being hauled off to the police station as a suspect, because he was incautious enough to carry an overcoat whilst wearing another, makes me wonder whether any other entomologists have had experiences similar to that which befel me one windy day last autumn. I was "fence-hunting"—often quite an interesting pastime during, or after, stormy weather even in the suburbs. I had examined and left several moths, including a fine *Catocala nupta* which had settled high up on a rather exposed fence. The wind had slightly displaced one fore wing, leaving a vivid patch of crimson and black visible—a bad "give-away" for an insect usually so beautifully camouflaged. A few minutes later I was accosted by a seedy-looking individual on a bicycle, who announced that he was a "police officer", producing, in confirmation thereof, a decidedly grimy small pocket-book. He told me that on several recent occasions he had seen me walking up one side of the road and down the other, stopping and examining fences at intervals, and he wanted to know "what I was up to". I laughed and asked him if he thought I looked like a prospective cat-burglar. Evidently we were not amused at this, so I led him back to the *nupta*. His face rather fell when he saw it, and I could not resist pulling his leg by pointing out that if Sherlock Holmes had had suspicions of my designs, his first action would have been to imitate exactly what I had done—stopping in the precise spot and examining the fence. "when", said I, pointing to *nupta*, "he could hardly have missed that could he?" We parted good friends, and he assured me that he did not propose to waste any more time "a follerin' of gents like you, Sir"! I am sure his private opinion was that I was ripe for Colney Hatch rather than Wormwood Scrubs!—P. A. CARDEW (Colonel); 21A, Thornton Hill, Wimbledon, S.W. 19, February 9th, 1938.

NOTES AND OBSERVATIONS ON BUTTERFLIES IN THE EASTERN COUNTIES DURING 1937.—As many other entomologists have found out, 1937 was one of the worst seasons for collecting on record. I do not ever remember such a poor time for the counties of Norfolk, Suffolk, Cambs. and Hunts. Without doubt, the weather played havoc everywhere, particularly in the part of the eastern counties which was so seriously flooded. *Papilio machaon* was particularly affected, especially at Wicken Fen, where the National Trust very wisely put a ban on its capture in any form so as to give the colony a chance to regain its normal strength. In its Norfolk and Suffolk haunts *machaon* has not appeared in anything like the numbers in which I have seen it in past years, also the Norfolk ones were much smaller than usual.

The "White." were abundant generally, but *Euchloë cardamines* was irregular; in some parts of Cambs. and Hunts it was plentiful, whereas in Norfolk and Suffolk, where I have seen it widely distributed in past seasons, it occurred very sparsely. Perhaps the most interesting fact was the scarcity of females; although I searched very carefully in all four counties, I did not observe a single one. *Gonepteryx rhamni* was fairly scattered in the Monkswood area of Hunts, also Cambs. had its fair share, in parts, but I only came across a few odd specimens in Norfolk and Suffolk.

In the very few localities where Fritillaries are found in the eastern counties collecting has been very poor. In Hunts, where I have previously taken *Argynnis paphia* at Monks Wood in plenty, this species had a very short season and very few were seen; also few specimens were observed in W. Norfolk and in the district of Great Yarmouth. I have no records of this insect for Suffolk and Cambs. Odd specimens of *A. aglaia* and *A. cydippe* were observed in W. Norfolk, Monks Wood and near Stowmarket, Suffolk. *A. euphrosyne* was much scarcer in Monks Wood and mid-Norfolk, but it is interesting to note some very dark specimens occurred. *A. selene* has completely disappeared from one locality in W. Norfolk, where up to 1936 it could be found in plenty; this part was flooded last winter. In the few odd localities in Cambs., Hunts and Suffolk where the species occurs very few were seen. The only eastern counties' haunt of *Euphydryas aurinia* I know produced two poor specimens, both males. *Hamearis lucina* was about on an average in Hunts, and a few specimens were obtained at Maddingley, Cambs.

Of the *Vanessas* *Nymphalis io* and *Aglais urticae* have been particularly noticeable compared with 1936, and the *urticae* taken proved to be of a much darker colouring; at Monks Wood I obtained a few very fine, though not outstanding, variations. *Vanessa atalanta* and *V. cardui* were widely scattered, the latter much more in evidence than in recent seasons, with the Norfolk and Suffolk coast well up to the average. Cambs. and Hunts also had a fair share of *cardui* wherever thistles abounded, and this year they were in plenty. *Nymphalis polychloros* has always been very scarce in the eastern counties. The only localities in which I have ever found it were near Norwich and between Stowmarket and Ipswich. This season I have

seen only five at the most. I have never seen nor heard of it in Cambs. or Hunts. Both *Polygonia c-album* and *Limenitis camilla* have appeared in fresh localities, the former being more generally distributed, especially at Monks Wood and near Kings Lynn, Norfolk; the latter seems to have established itself in parts of Cambs., W. Norfolk and E. Suffolk, where quite large colonies are going strongly, but the insects are smaller in size than the New Forest strain. I was pleased to note that *Apatura iris* has been seen once again near Stowmarket, also near Fakenham, Norfolk. At Monks Wood I had the pleasure (in company with my father and a friend) of seeing one of these fine insects in flight round some willow bushes.

Of the Lycaenidae only casual observations were made. *Polyommatus icarus* was poor in almost every part of all counties, although a few nice females were obtained. *Lysandra coridon* was not nearly so numerous as in recent seasons; at Royston I found that I was too late in the season; but at Ringstead, Norfolk, and Burwell, Cambs., I was more fortunate and obtained two very nice female varieties, though in general the insects were few and far between. *Aricia agestis* was fairly well distributed over Norfolk and Suffolk, and there did not seem to be any decrease in quantity, but only a very few were seen in Cambs. and Hunts. *Plebeius argus* was fairly abundant near Norwich and at Brandon, Suffolk, but I did not observe it elsewhere. *Celastrina argiolus* was very scarce; very few were seen anywhere. *Cupido minimus* was found in fair numbers on the Gog-Magog hills, Cambs.; but at Brandon, Suffolk, and in its usual haunts in Norfolk it seems to have completely failed, though in 1936 I obtained several from these places. Perhaps one of the most interesting things of note is the reappearance of *Lycaena phlaeas* in its regular haunts after two seasons' absence, although not in such great numbers; I obtained some nice specimens in Monks Wood, W. Norfolk, and Stowmarket, Suffolk, where it has been in plenty, as compared with other localities in the eastern counties. Of the "Hairstreaks" little can be said. *Callophrys rubi* was taken in all counties except Cambs., Monks Wood and W. Norfolk proving the best localities. *Strymon pruni* has almost gone, perhaps thanks to the efforts of collectors. It is time this insect was "banned" (as is *machaon*). I did not observe one of these insects this season, but I did hear of one collector who had beaten 29 larvae in a week! "Give *pruni* a chance in the 1938 season, collectors." *Thecla betulae* was also very scarce in Monks Wood, and few were taken in N.W. Norfolk or near Bungay, Suffolk, where it usually occurs. *T. quercus* was by far the most plentifully distributed of the Lycaenidae. Monks Wood, W. Norfolk woods and in many other parts where oak trees abound this pretty little insect was well in evidence. *S. w-album* was very scarce in all four counties, two specimens only being seen at Cambridge. Little need be said of *Satyridae* except that they were very plentiful in their regular haunts. Of the *Hesperiidae* *Thymelicus sylvestris* was by far the most plentiful in all four counties; *Erynnis tages* and *Pyrgus malvae* were also common, except in Cambs. I collected a few *Hesperia comma* on Newmarket Heath and the Gog-Magog Hills,

Cambs. *Thymelicus lineola* was also obtained near Burwell, Cambs., and at Beachamwell, Norfolk. The latter I believe is a new locality. *Ochlodes venata* was common in many parts of Norfolk and Suffolk, but was not nearly so abundant in Cambs or Hunts (with the exception of Wood Walton Fen) as in previous years. *Agapetes galathea* was confined to its usual haunts at Monks Wood, but was considerably down in numbers. *Pararge aegeria* and *P. megera* were somewhat scarce and only a few of each were seen. *Eumenis semele* was taken in some numbers near Swaffham, Norfolk, and on the Gog-Magog Hills, Cambs.; I did not come across it in either Suffolk or Hunts. One *Colias croceus* was taken on the Gog-Magog Hills, and I heard of two captures of *Nymphalis antiopa* from N. Norfolk; also one from Wyton, Hunts. To sum up, 1937 was a very disappointing season and, in my own case, only compensated by the capture of a few nice varieties. --ERIC SMITH; 30, The Broadway, St. Ives, Hunts.

RECENT LITERATURE.

A List of the Lepidoptera of Hertfordshire. By Dr. A. H. FOSTER, F.R.E.S. *Trans. Herts. N. H. Soc.*, vol. 20, Pt. 4, 1937.

We are glad to see this county list at last. Dr. Foster is to be congratulated on having got together such a very representative list comprising as it does more than half of the lepidoptera occurring in Britain. We feel that not very many more species can be added to the "Macros", but Durrant (as mentioned by Foster) was no doubt right when he said he could add a hundred species to the Hitchin list of "Micros" in a few days. We hope his words will be an incentive to the Microlepidopterists of the county, for parts of Hertfordshire are without doubt very rich with their different geological formations and plant associations.

It is rather remarkable how many species among the Micros have been recorded only by Boyd and Durrant, yet Boyd's localities round Cheshunt are still more or less as they were when he collected there. This is especially noticeable among the Tineina. Local lists always produce surprises; perhaps one of the most interesting is the record of *Maculinea arion* near Haileybury. We knew of the first record from Bowyer a good many years ago. Is it possible that there was a small inland colony in Hertfordshire, as there was in the old days at Barnwell Wold, Northants? No doubt motor transport from the Midlands and North accounts for the occasional introduction of species which are associated with those districts, such as *Hadena furva*, *Hadena pabulatricula* and *Plusia interrogationis*, and wild plants collected during holidays might account for others, but we can make no suggestion to explain the presence of such insects as *Lithosia lutarella* or *Agrotis praecox*. *Semiothisa brunneata* has turned up at

times at Wicken and Horning. Careful work along the Lea and Stort might produce further records of *Senta maritima*, *Caradrina phragmitidis*, *Nonagria geminipuncta*, *Leucania straminea*, *Donacula mucronellus*, *Schoenobius gigantellus*, *Phragmatoecia castaneae*, etc. We remember finding *Caradrina phragmitidis*, *Leucania straminea* and *Schoenobius forficellus* just over the Hertfordshire border in Middlesex.

We should have felt happier about the record of *Hadena crinensis* if it had stated that the determination had been confirmed by examination of the genitalia. It would also have added interest to the list if it had been possible to give the year of observation. For example, with such insects as *Melanchra chrysozona* it would have shown whether they still or no longer occurred in the county. An index would have been a great help to those who are not conversant with Meyrick's arrangement of the species. There are a few misprints, and the records under *Hemaris bombyliiformis* and *fuciformis* have evidently been transposed, possibly owing to the confusion that has existed in the nomenclature of these species.

H. M. E.

Über entomologische Sammlungen. By WALTHER HORN and ILSE KAHLE. Berlin: Ent. Beihefte aus Berlin-Dahlem, 1935-7. Pp. 536, 38 plates.

This recently completed revised version of Dr. Walther Horn's account of entomological collections, which first appeared as *Über den Verbleib der Entomologischen Sammlungen der Welt* (*Suppl. Entom.*, 1926 and 1929), fills 536 pages. A rough estimate shows that in this new work some 6600 entries occur, each giving a collector's name as fully as ascertainable, with dates of birth and death and a brief statement as to the present whereabouts of the collections he formed.

The information gathered together by Dr. Horn concerning the collections formed by the early entomologists, and therefore of historical importance, is extremely useful to "entomo-museologists", who have not been slow to show their appreciation. The utility of some of the entries dealing with more recent collections is, however, rather more debatable from the point of view of the systematist, though often of greater value perhaps to the collector. Of great interest are the thirty-six plates of reproductions of the handwriting, usually on a label, of very many well-known entomologists. This, indeed, might well provide a fund of information upon the character of systematists. If handwriting means anything at all, what arguments may not these plates give rise to in the future! At the end of the work Dr. Horn has added a series of chapters in which he traces the evolution of museum entomology, with special reference, naturally to Germany and Central Europe. The great names of the past, the old societies, the early publications are woven into a story of the beginnings of entomology such as only Dr. Horn could tell. He discusses, amongst other things, the birth of the older national museums of Europe—London, St. Petersburg, Vienna, Paris and Berlin, and he is by no means complimentary (and justly so) about the Walkerian epoch of the British Museum; deals historically and discursively

with the relation of systematic entomology to experimental zoology ; reads a homily on the lending and borrowing of specimens ; and touches on a thousand and one other topics with such sparkling wit that the reader has very few dull moments.

N. D. R.

OBITUARY.

MAJOR ERNEST EDWARD AUSTEN, D.S.O.

MAJOR AUSTEN, who died after a brief and unexpected illness on January 16th, 1938, was born in London on October 19th, 1867. Educated at Rugby and Heidelberg, he was appointed Assistant in the British Museum in 1889 ; in 1927 he was made Keeper of the Department of Entomology, retiring under the age-limit in 1932.

Placed in charge of the Diptera at a time when medical attention was becoming increasingly focused on these insects, it was only natural that Austen, faced with the impossible task of covering the whole Order, should have turned his attention especially to the blood-sucking groups. He quickly made a name for himself by his work on these insects, and between 1900 and 1912 produced a series of monographs and handbooks on *Glossina* and on British and African blood-sucking flies which were both accurate and comprehensive, and provided a sound working basis for medical and other students. In more recent years official duties claimed so much of his time that little was left for scientific work, and it was not until his retirement that he was able once again to devote himself wholeheartedly to this. His last publication (1937) was a *Monograph of the Bombyliidae of Palestine*, based very largely upon material which he himself had collected during the Palestine campaign. His entomological work is throughout characterized by extraordinary attention to detail and remarkable accuracy ; both are sharply reflected by the collections of which he had charge. None were better cared for or more painstakingly labelled and annotated than his own, which are a model of thoughtful arrangement.

Austen's career at the Museum included two expeditions to the tropics, one being to the Amazons, as naturalist on the "Faraday", the other to the West Coast of Africa. The latter was the first field investigation organized by the Liverpool School of Tropical Medicine, and on this he was accompanied by the late Sir Ronald Ross. He suffered two major interruptions in his work, however, of quite another kind, serving in the South African War in the C.I.V., and again throughout the Great War, with distinction. Intense patriotism and a strong sense of duty animated all his actions, and were well typified in his upright military bearing. He set his colleagues a high standard always, both in work and play, and those who had the privilege of serving with him will long miss his familiar figure, his manly spirit and support.

N. D. R.

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TWO NEW GENERA OF MALLOPHAGA

BY MISS THERESA CLAY AND COL. R. MEINERTZHAGEN.

ON Passerine hosts there occur three distinct genera of Philopteridae: true *Philopterus*, *Brueelia* (olim *Degeeriella*), and the genus described below. Waterston (*Zoologisches Jahrbuch*, 1915, 39 (1) : 27) first drew attention to the fact that *Philopterus troglodytis* (Waterston) differed markedly from the usual *Philopterus* found on the Passerines, and indicated that in certain respects it approached *Degeeriella* (*Nirmus*). The authors regret that they are unable to associate Dr. Waterston's name with this new genus, as every possible generic use of his name appears to have already been made.

Penenirmus gen. nov.

Head with lateral clypeal margins converging sharply towards clypeal suture, from thence margins converging more gradually towards anterior hyaline margin of head. Clypeal signature present and pointed posteriorly. Trabeculae narrow and pointed in both sexes; antennae filiform in the ♂ and ♀. Temples rounded but never swollen beyond the extension of the line of the lateral clypeal margin. Ventral occipital bands present, but no dorsal occipital bands as in *Philopterus*. Occiput with curved suture originating from antennal fossa each side. Prothorax rectangular; pterothorax narrow and pointed posteriorly. Abdomen elongated and hairy, with terminal segment rounded posteriorly in the ♂ and bilobed in the ♀. Pleurites distinct with re-entrant heads; tergal plates either narrowly separated medianly or continuous, or joined by a narrow posterior chitinous strip. ♂ genitalia characteristic, with paramera curved and not protruding beyond the mesosome; the latter consisting of a flattened plate with central penis.

Genotype: *Pediculus albiventris* Scopoli.*

This genus is readily distinguished from *Philopterus* by the smaller trabeculae, narrower temples, the shape of the abdomen, arrangement of the tergal plates, the distinct pleurites and by the ♂ genitalia.

Species of *Penenirmus* have been recorded from the following Passerine genera: *Alaemon*, *Ammomanes*, *Dicrurus*, *Eremopteryx*,

* When the Mallophaga of *Troglodytes troglodytes* are examined in a fresh state it is apparent that the description of *Pediculus albiventris* Scopoli applies to a species of *Penenirmus*, the white abdomen being a distinctive character. *Philopterus troglodytis* (Waterston) thus becomes a synonym of *Penenirmus albiventris* (Scopoli).

Galerida, *Grandala*, *Lanius*, *Melanocorypha*, *Mirafra*, *Muscicapa*, *Oenanthe*, *Pericrocotus*, *Phylloscopus*, *Pogonocichla*, *Prinia*, *Pythoris*, *Sazicola*, *Sylvia*, *Troglodytes*, *Turdoides*. Also from the following genera of Woodpeckers (*Pici*): *Blythipicus*, *Brachypterus*, *Dendropicus*, *Dryobates*, *Gecinulus*, *Iynx*, *Picoides*, *Picus*.

The Ischnoceran genus described below is unlike any hitherto recorded from the Woodpeckers (*Pici*) in having the head circumfasciate.

Picicola gen. nov.

Head circumfasciate; trabeculae narrow and elongate in both sexes; antennae filiform in ♂ and ♀. Antennal band with greatly thickened internal margin sometimes cellulated in appearance;

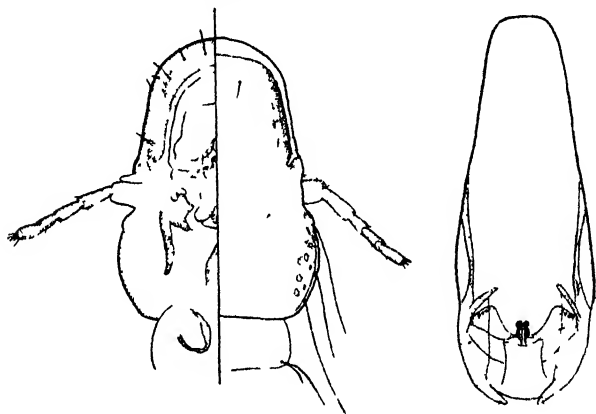


FIG. 1.

FIG. 2.

Picicola praeposterus ♂, head (Fig. 1) and genitalia (Fig. 2).

occipital bands and signature present: temple bands thickened and sometimes showing cellulated appearance internally. Temples rounded but not greatly swollen (Fig. 1). Abdomen elongate with first segment short; pleurites distinct with re-entrant heads. Genitalia with short curved paramera and mesosomal plate rounded posteriorly (Fig. 2).

Genotype: *Picicola praeposterus* sp. nov.

***Picicola praeposterus* sp. n.**

Male with head as shown in Fig. 1. Prothorax rectangular in shape with long postero-lateral hair. Pterothorax with lateral margins diverging posteriorly; posterior margin flattened, and bearing a spine and 6 dorsal hairs each side of the mid-line. Abdomen elongate with segment 1 short, and the terminal segment narrow and rounded posteriorly. Pleurites each with an anterior and posterior inwardly directed process; tergal plates transversely continuous.

On the dorsal surface segment I has 2 anterior and 4 posterior hairs; segments II-VII have 4 central hairs and a post-spiracular hair each side; segment VIII has 2 central hairs; segment IX has 2 terminal hairs. On the ventral surface segments I-VII each have 2 central hairs; segment IX has 2 central hairs and 8 marginal and submarginal hairs each side. Segments I-II have no postero-lateral hairs; segments III-IV have 1 hair each side; segments V-VIII have 2 hairs each side. Genitalia as shown in Fig. 2.

Female similar to the male with thorax and abdomen broader. Abdomen with terminal segment bilobed posteriorly. Posterior edge of valve rounded with a single row of 16 marginal hairs.

Material examined: 6 ♂♂ and 6 ♀♀ from *Dryobates sindeanus* from Peshawar, India.

Holotype: ♂, slide no. 9217 (Meinertzhagen Coll.).

Picicola campethera sp. n.

This species is distinguished from the preceding species by the shape of the head and the ♂ genitalia.

Male with head as shown in Fig. 3. Prothorax rectangular in shape, with long postero-lateral hair. Pterothorax with lateral

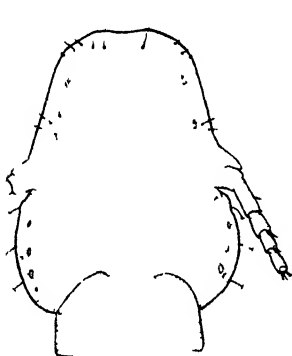


FIG 3

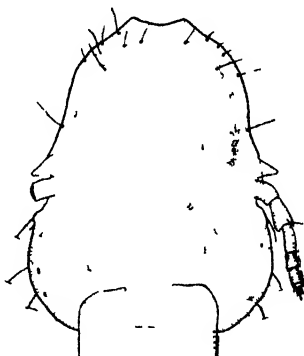


FIG 4

Picicola campethera ♂ (Fig 3) and *Picicola thripas* ♀ (Fig. 4)

margins diverging posteriorly; posterior margin flattened and bearing a spine and 5 hairs each side. Abdomen elongated with segment I short and terminal segment narrow and rounded posteriorly. Pleurites with re-entrant heads and each with an anterior inwardly directed process; tergal plates transversely continuous. On the dorsal surface segment I has 2 anterior and 2 posterior hairs; segments II-III have 4 central hairs and a post-spiracular hair each side; segments IV-VI have 5 central hairs and a post-spiracular hair each side; segment VII has 4 central hairs and a post-spiracular hair each side; segment VIII has 4 hairs; segment IX has 3 hairs each side.

On the ventral surface segments I, II and III have 4 hairs; segments IV-V have 5 hairs; segment VI has 4 hairs; segment VII has 2 hairs; segment IX has 2 central and 11 terminal hairs. Segments I-II have no postero-lateral hairs; segments III-IV have 1 hair each side; segments V-VII have 2 hairs and segment VIII 1 hair each side.

The ♂ genitalia are similar to those of *P. praeoposterus*, but the penis is more elongated and the form of the mesosomal plates is different.

Holotype and only specimen: ♂ from *Campethera abingoni mombassicus* from Amani, Tanganyika; slide no. 4485 (Meinertzhagen Coll.).

Picicola thripas sp. n.

This species is distinguished from the two preceding species of *Picicola* by having a deep and irregular concavity in the anterior margin of the head.

Female with head as shown in Fig. 4. Prothorax with lateral margins somewhat rounded and posterior margin straight, with a long hair at each postero-lateral corner. Pterothorax with sides diverging posteriorly; posterior margin with a spine and 6 hairs each side of mid-line. Abdomen elongate with terminal segment bilobed posteriorly; pleurites with re-entrant heads and without internal processes; tergal plates transversely continuous; valve with rounded posterior margin bearing 18 marginal hairs and a number of submarginal spines.

Holotype and only specimen: ♀ from *Thripas namaquus namaquus* from Kenya; slide no. 6892 (Meinertzhagen Coll.).

A fourth species in this genus is represented by an immature ♀ from *Picus canus canus* from Estonia, and is probably a new species.

MEASUREMENTS.

	<i>P. praeoposterus</i>				<i>P. campethera</i>		<i>P. thripas</i>	
	♂.		♀.		♂.		♀.	
	Length.	Breadth.	Length.	Breadth.	Length.	Breadth.	Length.	Breadth.
Head	.48	.34	.52	.37	.49	.40	.53	.43
Prothorax	.12	.22	.14	.26	.12	.25	.16	.28
Pterothorax	.14	.29	.17	.40	.18	.37	.18	.35
Abdomen	.98	.36	1.33	.59	1.04	.53	1.20	.35

LIMENITIS CAMILLA IN LEICESTERSHIRE.—Dr. A. A. Lisney, F.R.E.S., and myself, working a wood in the extreme west of Leicestershire, and near the Rutland border, saw and examined a single specimen of *L. camilla*, male, on August 2nd, 1937. It was slightly worn, and had a chip out of the right hind wing. It was behaving in its usual manner, settling and returning to one oak branch on the edge of the wood. This, I believe, is the first record of this insect in Leicestershire.—H. A. BUCKLER.

WINTER AND SPRING BUTTERFLIES IN A RIVIERA GARDEN.

By LT.-COL. N. ELIOT, C.B.E.

WATCHING for immigrant *V. cardui* throughout the winter 1936-37 and spring 1937, I took the opportunity of noting all butterflies, and the "Humming Bird", seen on fine days in my garden on the south coast of France, sitting for this purpose an hour or more in the morning on a terrace cut out of a steep slope about 100 ft. above the sea. This terrace is a veritable sun-trap, and is sheltered by the top 20 ft. of the slope from the Mistral, our chief bane, a cold dry blustering north wind which nevertheless blows all clouds out of the sky. From these notes the table printed herewith has been compiled in the hope that it may be of some interest as indicating how continuously throughout the winter butterflies were flying. Naturally the species seen in one garden are far from all to be found in this locality (Cavalaire), which is situated near the centre of the coast line of the Maures, hills of siliceous rock free from lime, and generally covered with pine, cork-oak and ilex, and undergrowth of cistus, tree-heather and arbutus.

This winter season was unusually dry, under 20 in. of rain only falling from October 15th to April 15th, and four subsequent sprinkles, totalling less than half an inch. Consequently by June most of the grass and low herbage was already withered and turning brown: little more rain was likely until well on in September. The temperature dropped to just on freezing during two or three nights towards the end of December, touching the leaves of a few tender plants in exposed places, but generally the cold period (December-January) averaged about 58° F. maximum and 38 minimum.

(Of course many cultivated flowers keep in bloom along the Riviera in the winter, but there is also a succession of wild flowers to be found, such as the wood daisy (*Bellis silvestris*) in December and on into January, wild marigold (*Calendula arvensis*) throughout January and on into February, when the rosemary begins to blossom, followed by many early spring flowers. There is little cultivation in the vicinity except of vines and some grassland (hay) in the widely dispersed alluvial flats.

Except for two periods of absence of a fortnight each, I watched on an average at least three out of four sunny days, and the table shows the number of days (or occasions) on which one or more of the various tabulated species were seen (not the number of individuals on any particular day), as well as the total number of days of observation for each approximate quarter month, A, B, C or D.

Insects were visually identified, very few being captured. This table epitomizes most of the information obtained, but the following additional notes may also be of interest :

I arrived at Cavalaire about the middle of October, but was not able to start watching regularly until the third quarter (C in table) of November. Up to October 20th *Maniola jurtina* (worn), *Colias hyale* and *Gonepteryx cleopatra* were seen, and *Pieris brassicae* were mating. *Vanessa atalanta* was in evidence, but I have no note of *Macroglossum stellatarum*. It struck me that as winter approached both the last-named were preoccupied with the urge to find hibernating quarters, but that the temperature did not drop sufficiently to fix hibernation, and once they started to fly they kept on doing so on every opportunity. *G. cleopatra* definitely went into hibernation in spite of the favourable weather, while *Colias croceus* made no attempt to do so. On November 15th a *Lampides boeticus* was seen, and on the 20th a *Syntarucus piritrons*. On the 30th *P. brassicae* caterpillars, half grown, were crowded on some stocks. Butterflies at first were fairly numerous, but they gradually dwindled until only one, or sometimes two, of each species was seen. By February 2nd *M. stellatarum* were again numerous, three being seen simultaneously on that day. On February 28th, a *Polygonia c-album* was seen. The first few times I saw *Nymphalis polychloros* the insect obligingly settled, but several flying fast in March that I would have liked to identify as the same were probably Emperor Moths. On March 21st a *Libythea celtis* flew past.

With us *Freezias* grow freely in the open, seeding themselves, and in many cases the throat of the flower is so long that in trying to feed *M. stellatarum*'s wings appear to be pressed back, when they come to rest and the moth thrusts itself in a little further. I also saw (in May) the Broad Bordered Bee Hawkmoth vary its procedure when feeding on purple *Buddleia*, settling on the spike and then, wings at rest, striding daintily over it, probing the florets here and there. A pretty sight, and interesting in that here is choice and not apparent compulsion as in the case of the *Freezia*.

On April 8th a *Thais cassandra* wandered into the garden from its more usual haunts. This month solitary *Nymphalis antiopa* were also seen flying fairly high. I suspect that could I have searched watercourses in the vicinity I should have seen these "white-bordered" specimens far earlier. I have never seen freshly emerged *N. antiopa* in this neighbourhood, and it seems probable that as the cold comes on they wander down from higher ground in the north where sufficient foodplant for breeding is to be found. When they disperse again as the year warms up only those that fly back north would breed. Perhaps something of this sort might initiate a migratory habit. I have seen the fresh insect

1936-37: Month.		Nov.			Dec.			Jan.			Feb.			March			April			May			June.		
Week	Days' observation	Absent			Absent			Absent			Absent			Absent			Absent			Absent			Absent		
		C	D	A	B	C	D	C	D	A	B	C	D	C	D	A	B	C	D	A	B	C	D	A	B
		4	2	1	2	3	1	3	3	5	5	6	5	3	5	3	3	1	3	2	4	6	7	3	3
<i>Vanessa cardui</i>						1		1						3	5	3	3	1	2	1	3	2	3	3	
<i>V. atalanta</i>			2		1	3	1		2	2	3	4	3	2	1							2			
<i>Nymphalis polychloros</i>								1	2	1			1												
<i>N. antiopa</i>																	2	1							
<i>Limnitis reducta</i>																	3	1	3						
<i>Charaxes jasius</i>																									
<i>Pararge aegeria</i>		4	2	1													1	3	1	3	1				2
<i>P. megera</i>		2		1					1	3	4	6	4			2	4	3	1	1					1
<i>Maniola jurtina</i>																				1	3	5	2	3	3
<i>Autocera proserpina</i>																									
<i>Callophrys rubi</i>																									
<i>Strymon esculi</i>													1	3		1	2								
<i>Celastrina argiolus</i>									4	4	6	2			2	2		1							3
<i>Polyommatus icarus</i>																1	1	1			1	2			1
<i>Lycaena phlaeas</i>																	1				1	3	1		1
<i>Iphiclus podalirius</i>																									
<i>P. machaon</i>																				1	1	4	1	1	2
<i>Pieris brassicae</i>		3	2	1																2		6	7		
<i>P. rapae</i>										1	1	2													
<i>Euclyptus helia</i>										3	5	6	2			1	4	3	3						
<i>E. cardamines</i>																									
<i>Colias croceus</i>		4	1	1	1	3	1		1	3	4	5	4			1	1	1	1						
<i>Gonepteryx cleopatra</i>											2	1	3	1		2	4	3	3						3
<i>Ochlodes venata</i>																									
<i>Macroglossum stellatarum</i>		2				1		1	3	4	5	6	3			2	3	3	3						

high up in the Alpes Maritimes. On April 5th during a drive northward into the foothills of the Basses Alpes many "white-bordered" *N. antiopa* were also seen at a moderate elevation where a fair number of willows grow on the banks of the streams meandering down the long valleys between low limestone ridges. In the last week of April another *L. celtis* and a worn *Nymphalis io* were seen. This butterfly as well as *Aglais urticae* is scarce with us. A first *Aricia agestis* as well as a "chequered" skipper, possibly *Pyrgus malvoides*, also appeared.

Early in May a "small" skipper was seen. This, as in many a subsequent case, might have been any one of the three similar insects. On the 13th the last *L. celtis* was seen and a first *Melitaea*, subsequently both *M. didyma* and *M. cinxia* being identified. On the 16th and 17th an *Agapetes psyche* flew rapidly about the garden, but I had already seen this species in numbers in scrubby country several miles to the east. A first *Carcharodus lavaterae* was seen on the 22nd, on which day two fresh *V. atalanta* were feeding on the Buddleia. This bush had also bloomed towards the end of October (being pruned after each flowering), but the two or three *V. atalanta* then flying never approached it, though it was most attractive to numerous *Pieris brassicae*. The last of the 1936 survivors had been seen on March 2nd, making an interval of over 11 weeks in which to find foodplant, breed and reappear. Next day only one *V. atalanta* was feeding and thereafter no more appeared. I have never seen here such a crowd as enliven Scottish gardens some autumns, but then nettles are not common in this neighbourhood.

In the last week of May *Argynnis lathonia* and *A. maia* came to the Buddleia. A "chequered" skipper, perhaps *sao*, flew past, and *Pontia daphdice* appeared for the first of several occasions. *Aporia crataegi* was also seen in the garden, but this did not prepare me for the sight, when driving on the 28th in the foothills of the Basses-Alpes at over 2000 ft. altitude, of incalculable thousands of these fluttering creatures. For mile after mile, as far as the eye could trace from the road, there did not seem to be a square yard untenanted over all the wide-spreading and somewhat arid limestone plateau, where the hawthorn grew so sparsely scattered that adequate food supply seemed precarious indeed. Nevertheless there was not the slightest sign of mass movement.

In the first week of June *Thecla quercus* appeared, and *Maniola ida* flew throughout the second week. This is early, but apparently only males were out, five caught on the 15th being of that sex. On the same day the first *Agapetes galathea* appeared. What were almost certainly fresh male and female *Gonepteryx cleopatra* were seen in the second week, most of the appearances of the previous fortnight being of a solitary battered old male that flew excitedly

round and about without settling to feed. The *Strymon ilicis* ab. *esculi* tabulated were very numerous. During the same period in 1935 not a single individual was seen, but my son collected a fine series of ab. *cerri* along hill streams some ten miles eastward. This would call for no remark in the case of different species,* but it seems strange that two widely divergent races of the same species should inhabit localities so close together and so similar in character of soil and vegetation. I was surprised that neither *C. croceus* nor *C. hyale* had reappeared in the garden, although a few of the former had latterly been seen here and there in the coastal region, and on June 18th, driving over the Cevennes on the journey back to England, *hyale* was seen in numbers at 3000 ft. on ground where *A. japygia* was flying. Possibly the extreme dryness of the spring months and early withering of the low herbage on the coastal strip had something to do with this.

* *Strymon ilicis* and *S. esculi* are distinct species in my opinion —N D R.

LITHOSIA DEPRESSA AND LITHOSIA GRISEOLA IN IRELAND.—As there appeared to be some confusion over the occurrence of these species in Mr. Beirne's record (1938, *Entom.*, 71 : 20), I asked him to send me all the specimens, which he has now very kindly done. I find the first specimen, which I had previously identified as *L. griseola* ab. *flava*, is not this species, but *L. depressa* ab. *unicolor* Banks, and this has also been confirmed by Mr. Tams. When I first saw this specimen, a rather pale and worn female, which had been taken in a marshy place, I thought, not then knowing that *L. depressa* ab. *unicolor* occurred in Ireland, that it could only be *L. griseola* ab. *flava*. I must apologize to Mr. Beirne for my mistake. It is remarkable how very similar these forms are, except for the slightly narrower and longer wing in *depressa*. The records must now be amended as follows :

L. griseola ab. *flava* must be deleted.

L. depressa will read : Cahirnane 7, including 1 ab. *unicolor* ; Muckcross 1 ab. *unicolor* ; Flesk 2 (1 ab. *unicolor*) ; Kenmare demesne 1 ; Killarney 1. Donovan also records *L. depressa* from Tyrone (rare) and Kerry (3 of which are ab. *ochreola* Hb.). One of Mr. Beirne's *L. depressa* ab. *unicolor* is a very handsome insect, larger and deeper in colour than E. R. Banks's specimens. —H. M. E.

CATOCALA NUPTA IN LEICESTERSHIRE.—I was about to inquire if this insect had reached Nottinghamshire when I saw the note in the January issue (1938, *Entom.*, 71 : 12). There was no record for it for Leicestershire until 1934, when it was taken singly in the south of the county near Market Harborough. 1935 again produced only the odd specimen, but further north, in Leicester itself. In 1936 it had spread to half-way between Leicester and the Nottinghamshire border, and was beginning to be taken generally. This year it has been quite plentiful.—H. A. BUCKLER ; 3, St. John's Road, Leicester.

THE LEPIDOPTERA OF CARA ISLAND.

BY W. H. DOWDESWELL AND E. B. FORD.

FOLLOWING two previous expeditions by members of Oxford University (Dowdeswell, 1936, 1937), we paid a visit this year to the small island of Cara, for the purpose of obtaining further information concerning its Lepidoptera. We remained there from June 30th to July 15th. About one mile long and half a mile wide, Cara lies approximately three and a half miles west of Tayinloan on the mainland of Kintyre. Being entirely windswept, there are no trees on the island, but a certain amount of dwarf willow grows in some of the more sheltered places. Apart from this, the predominant vegetation consists of grasses, bracken and heather, with rushes and irises in the more low-lying and damper places.

On the two previous occasions we obtained 45 species of Lepidoptera in all, 10 being butterflies and 35 moths. This year we secured 9 others new to the island. These were: *Noctua brunnea*, *N. primulae* var. *conflua*, *N. rubi*, *Triphaena comes*, *Mamestra pisi*, *Rivula sericealis*, *Plusia pulchrina*, *Cidaria designata*, *Eupithecia nanata*. With these additions the total number of Lepidoptera now caught on Cara is 54 species, 10 being butterflies and 44 moths. We also found for the first time *Xylophasia rurea* var. *combusta* and *Eupithecia satyrata* var. *callunaria*, though the typical form of both these species had been taken previously.

Last year, as already recorded (Dowdeswell, 1937), we were surprised to observe that rats would stalk the sugar-patches and eat the *Xylophasia monoglypha* which they found there. It was interesting to confirm that experience this year. We had sugared a number of low rocks near the house, and on several occasions, as we approached these about midnight, we saw a rat dart away. On examination, the freshly severed wings of *X. monoglypha* were lying near the sugar-patch. Unfortunately, the bad weather prevented us from carrying out further investigations concerning the lengths to which the rats would go to secure the species for food, but presumably they would not be a serious selective agent under natural conditions.

As mentioned in the account of last year's work, we conducted breeding experiments on *Xylophasia monoglypha* in the hope of determining the genetics of melanism in this species. Despite a very high mortality among the young larvae, the remainder proved to be quite hardy, and a high percentage pupated and emerged successfully in the following May and June. Unfortunately, these refused to pair in captivity; not a single fertile batch of eggs resulted from the numerous pairs which we attempted to mate.

The work had thus to be abandoned without any further information being gained. However, as previously mentioned, owing to the extreme variability of this moth, comprising a complete range from the lightest to the darkest forms, it seems probable that melanin deposition is controlled by multiple factors, as in *Oporinia dilutata*.

This year we attempted to repeat our estimation of the total number comprising the *X. monoglypha* population on Cara, and of the elimination per night to which it is subject. Unfortunately this proved to be a failure owing to the great scarcity of the moths, for, during the fortnight that we were on the island, we only succeeded in capturing 34 specimens. One possible explanation of their rarity is that a marked fluctuation in numbers may have taken place in the species. However, it seems more likely that the very bad weather then prevailing had retarded the emergence of the insects; further, our arrival on Cara this year was a fortnight earlier than last. On the 1935 expedition, when we also arrived on June 30th, *X. monoglypha* was plentiful, but the weather was extremely fine and warm on that occasion. With these very small numbers it was hardly surprising that we did not recapture a single marked specimen, especially if an elimination of 50% per day, estimated last year, represents the approximate mortality this year also.

The colony of *X. monoglypha* on Cara provides, with appropriate methods of sampling, an exceptional opportunity for determining the death-rate in a wild population of Lepidoptera; for we have evidence that leakage from it due to migration is negligible. We are discussing the details of this situation more fully in a separate paper. As no data appear to exist on the mortality of wild populations of moths, and the importance of such information is considerable, we hope to continue our study of this problem on a future occasion.

REFERENCES.

- DOWDESWELL, W. H.—1936, *Entomologist*, 69 : 49-53.
Idem.—1937, *Ibid.*, 70 : 169-75.

University Museum, Oxford.

EARLY BUTTERFLIES IN 1938. —The warm sunny spell which began on March 1st—temp. 60° to 64° F., with night frosts—brought out *Gonepteryx rhamni* in several places. Records which have reached me include the following: *Aglaia urticae* at Dartmouth and Ashburton (Devon), March 3rd to 6th; *Nymphalis io* at Deal, March 6th; *Lycæna phlaeas* at Ashburton on March 4th (S. T. Stidston); *Vanessa atalanta* at Glengarriff (co. Cork) on March 2nd (J. E. Flynn), and at Ashburton on March 5th; *Vanessa cardui* on March 11th at Plym Bridge (F. G. Smart).—(Capt.) T. DANNREUTHER, R.N.; "Windycroft", Hastings.

THE DRAGONFLIES OF BYFLEET.

By C. O. HAMMOND, F.R.E.S.

THE Basingstoke Canal at Byfleet, Surrey, winds quietly through woodland and heath, and provides a wealth of insect fauna of most orders. Not many localities can boast of twenty-three species of Paraneuroptera, of which eighteen can always be found at the appropriate season.

Cordulegaster boltonii Donovan, must be regarded as a visitor. On July 7th, 1935, I took a fine male hawking along a small ditch at the side of the canal, and on July 26th of the same year a female was observed by H. G. Attlee (*Entom.*, 70 : 14).

Brachytron pratense Muller, is common. The male will be found hawking close to the edge of the bank, with a restricted beat of a dozen or so yards, and very often hovering among the reeds. The female only visits the water to oviposit in the shade of the overhanging vegetation, and her presence is generally detected by the vibration of her wings against the reeds or grasses. The species has a comparatively short season, and will be found at its best from mid May to mid June.

Aeshna cyanea Muller, is fairly common and best looked for in early August. Like the preceding species, it prefers to fly close to the side of the canal, though it will not infrequently be found flying in open glades, particularly at dusk.

A. juncea Linnaeus, does not fly so close to the edge as *A. cyanea*, and need never be confused with it when in flight, for *cyanea* appears greenish, while *juncea* is distinctly blue. *Juncea* likes to settle on fir trees, and also on the trunks of Silver Birch. This species, at its best in August, is much less common than the other species of the genus.

A. mixta Latreille, is very well established and common in August and September. When teneral this species flies high, from 10-14 ft., but later flies low and close to the edge of the water. The female oviposits several inches above the surface of the water, usually on a reed, and is not nearly so timid as the other females of the genus.

A. grandis Linnaeus, is abundant by the end of July. The brown *Aeshna* keeps well away from the edge, flying more to the centre of the canal, from 5-6 ft. above the water. The female will often be seen resting on leaves of *Potamogeton* to oviposit.

Anax imperator Leach, common by the end of June, flies in truly regal fashion along the centre of the canal, and rarely visits the edge, unless to chase some other species, so that one needs much patience to make a capture. The species loves to sun itself low down

on stems of bracken or heather for long periods, but is very easily startled. I have seen five females resting on Potamogeton to oviposit in a space less than three yards square.

Cordulia aenea Linnaeus, common early in May, is another species which hawks by the edge with a beat of about 20 yards. The female is seldom seen, coming to the water only to oviposit, hovering on the wing while striking the surface with the abdomen, the beating of wings against the reeds betraying her presence.

Somatoclora metallica Van der Linden.—It is fortunate that this beautiful and rare species is well established, and common in some years from the beginning of June. When teneral the males fly from 6–10 ft. above the water, and teneral females will be found flying higher over heath and bracken, and settling on trees. Mature males fly low at the edge in the same manner as *C. aenea*, though *metallica* looks far brighter with its golden-green lustre. The mature female is rarely seen, and, in addition, is extremely wary—a factor fortunate in the preservation of the species. She oviposits in the mud of the bank, and will sometimes be found resting in long grass at the side.

Orthetrum coerulescens Fabricius, seems to be another visitor. I first took it on July 7th, 1935, when several males were flying round a boggy pool near the canal; and on August 8th, 1937, I knocked up a female from bracken near the same spot.

Libellula quadrimaculata Linnaeus, is abundant at the end of May. The species settles frequently on burr-reeds by the edge of the canal, and is not easily disturbed. I have been able to approach within 2 ft. with a cine-camera.

L. depressa Linnaeus, will not usually be met with by the canal, but on hot, sunny days in May and June it will sometimes be found on the adjoining heath, though it is not common there.

Sympetrum striolatum striolatum, Charpentier, is abundant in late August and September, and will be found resting on the tow-path or hovering and darting near the bank.

S. danae Sulzer, is only an occasional visitor, probably in wet seasons, as I have only seen it at boggy pools similar to its well-known localities.

Agrion splendens Harris, common from the end of May, will best be found where the canal joins the River Wey. It suns itself for long periods on reeds or rushes. Courtship is pretty to watch, the male repeatedly spreading and closing its wings, crawling up and down the reed to face the female.

Lestes sponsa Hansemann.—I have but one record for this species, a male observed July 17th, 1926. I cannot account for the absence of such a common species, as the locality seems so similar to its well-known haunts.

Platynemis pennipes Pallas, will be found abundantly in the same locality as *A. splendens*, though it will be met with singly at other portions of the canal from June onwards.

Pyrrhosoma nymphula Sulzer, usually the first dragonfly to appear, is abundant, and at its best from the middle of May.

Ischnura elegans Van der Linden, also abundant, and with a very long season, from early May till late September, is certainly a hardy insect, and the only Zygopterid I have found on the wing in dull cold weather.

Erythromma najas Hansemann, common in June, will be found resting on Potamogeton, or flying round it. This species rarely comes to the side, and flies very close to the surface of the water, so that it is difficult to net without touching the water.

Enallagma cyathigerum Charpentier, common from the end of May, enjoys a very long season till September, and will be found flying across the canal from side to side. The insect seems to like flying against the wind close to the surface of the water, and manifests great strength for its size.

Coenagrion puella Linnaeus, is abundant from May onwards. Variable females of this species may be confused with *C. pulchellum*, which is also present, so that examination under a lens is desirable.

C. pulchellum Van der Linden, is fairly common in a good season from May onwards, but the species does not appear to be so common as formerly, so it is hoped it will be preserved.

34, Passmore Gardens,
New Southgate, N. 11.

CORRECTION.—“Kenton (Devon),” given as the locality (*Entom.*, 71 : 65, line 20) for the capture of a *Cidaria obstipata* by D. S. Fletcher should read “Kenton (Mdx.)”. Admittedly the original record (*Entom.*, 70 : 285) was ambiguous, but I did not know there was a Kenton in Devon.—N. D. R.

VANESSA ATALANTA HIBERNATING IN HAMPSHIRE.—On December 22nd, 1937, a Red Admiral was flying about in the sitting-room of a farm-house at Bramdean, near Petersfield. Obviously the specimen must have been hibernating here. When an old house alongside the Bournemouth Pleasure Gardens was being demolished during the last week of January, 1938, my attention was called to a number of *Aglais urticae* and *Vanessa atalanta* sleeping on the walls of the upper rooms, to which access was available through broken windows. Last autumn an alder some 30 ft. from the house attracted large numbers of *V. atalanta* to the borings made by *Cossus cossus*. I counted no less than fourteen specimens on the trunk one day, probably attracted by the smell of the *Cossus* larvae, and it is thought that some of these Vanessids were the specimens subsequently seen hibernating in the ruined house.—(Lt.-Col.) F. C. FRASER, “Mercara”, Bournemouth.

THE LIFE STORY OF *APATURA IRIS*.

BY STANLEY MORRIS.

(Continued from p. 53.)

THE LARVA.

The larva emerges about the fourteenth day. It is of a pale greenish-yellow colour and little more than 3 mm. in length. The head is large, black and globular, slightly bilobed, and seemingly out of all proportion to the remainder of the body. When viewed under the lens the anal segment is very slightly bifid, each point terminating in a whitish hair.

Immediately after hatching the larva makes its way to the tip of the leaf, and here it takes up a position on the midrib of the curled apex and facing the stem. This position is characteristic in all stages of growth, the larva leaving it only for the purpose of feeding or moulting.

The young larva moves without first spinning over its track with silk, as in its later stages, but, even at this early stage, it adopts an oblique position by raising the forepart of the body as far as the prolegs and so resting in its "seat".

For the purpose of feeding, the larva makes its way to the edge of the leaf, at a point not far distant from its "seat", and here it eats away the entire substance of the leaf with the exception of the large veins, in irregular portions, afterwards returning to its "seat" by the same track.

It is somewhat singular that the larva should select the curled apex of the leaf for its dormitory, since it necessarily follows that, after rain, this is the natural channel through which the surface-water drains away; hence at times, after heavy rain, the larva would seemingly have a very uncomfortable time of it. Possibly it is on this account that the oblique attitude of resting before referred to has been evolved, so that, should the position become untenable during severe downpours, relief could always be obtained by this habit of raising the forepart of the body clear of the surrounding foliage. From what I have seen, however, I do not think that the young larva is at all incommoded by surface-water. It appears to be quite comfortable, even when practically submerged, and I must admit that I have never seen one, in any stage of growth, holding out the signal of distress by striving to keep its head above the flood.

First moult.—The larva "sets" for the first moult when from nine to twelve days old, having first spun over the portion of the

upper surface of the leaf upon which it rests. Here it remains motionless, close pressed against the leaf, during the whole process, which occupies from three to four days. The cast skin is frequently (but not always) eaten, with the exception of the mask or head covering. This is cast separately in its entirety and falls to the ground. After the moult the larva assumes a very different appearance: the large black head-piece is now replaced by an angular mask of an ochreous-brown colour, furnished with two horns, about 1.4 mm. in length, projecting in the shape of a V. These horns are clubbed at the tip and very slightly cleft. The colour of the larva is now a middle green, the skin wrinkled and the whole surface rough with minute bristles. The segments of the body are clearly defined by oblique stripes of a yellowish-white colour. There is a prominent V-shaped, wart-like protuberance of a deeper shade on the seventh segment, on the dorsal surface, and smaller wart-like markings on the eighth and ninth segments. In shape the body is nearly cylindrical, tapering only at the anal extremity to a fine point. It measures, inclusive of the horns, about 7 mm. When resting, the horns are lowered, so that they project on the leaf, but when crawling the head is raised, with the horns pointing obliquely upwards. The fore part of the body as far as the fourth segment is waved frequently from side to side in its progress. It spins no web underfoot, as is invariably the habit of the larva during later stages.

Before commencing to feed again the larva usually rests for a space of from twelve to eighteen hours, during which period the new skin is hardened and acclimatized. It then usually occupies the same "seat" as in the first stage.

Second moult.—The period between the first and second moults appears to be fairly constant, namely, from fifteen to twenty-one days. The earliest date that I have known larva acquire the third coat has been August 24th, and this date is consistent with the normal instar periods of a larva hatched out about July 29th, from an ovum deposited about the 15th of that month. Any larva found in the second coat after the end of September will in all probability hibernate in that condition, and will not moult a second time until the following spring. I have records of more than a few such instances of larvae passing the winter after the first moult.

The period occupied by the second moult is similar to the first, viz. from three to four days, and the process, as regards the casting of the old skin and the rest period after the moult is completed, is precisely the same as in the previous stage. The upper surface of the leaf is always chosen for the purpose of the moult in all stages and the position occupied is usually about midway between the tip and the centre of the leaf and towards the midrib. The leaf is

first well spun over with silk, and upon this the larva takes up its position, with its head facing the stem of the leaf. During the moulting process the larva turns paler in colour, the skin on the thoracic segments gradually becomes swollen and the head of the larva is somewhat contracted beneath it. Dehiscence takes place at this juncture, and the old skin is gradually thrust back towards the anal extremity, until the larva can clear itself and emerge in its new attire. This process is similar in all stages of growth.

Immediately after the moult the larva measures about 12 mm. in length, inclusive of the horns, and, as regards coloration and markings, no change has been effected. The body, however, is now more uniformly tapering towards the anal extremity. The anal points are united, with a distinct depression running longitudinally down the middle, which gives the impression that they are divided. The horns are now furnished with a reddish knob and are not cleft as in the previous stage.

At this stage every movement of the larva is more cautious. It never crawls without first spinning over the portion of the leaf to be traversed with silk applied by the mouth. During this process the head is moved in a curve, from side to side, alternatively, and the silken thread attached to the surface of the leaf at the end of each curve. In this manner it lays a well-defined track between its "seat" and the portion of the leaf selected for feeding, and from this track the larva never digresses when moving to and fro from its "seat", which is usually in the curled apex of the leaf as in former stages.

I use the word "usually" in the last paragraph advisedly, because, in 1933 many larvae in this stage were found resting either in the centre of the leaf or at its side, about midway between the stem and apex. This position is most unusual, and I have never noted it before or since. 1933, it will be remembered, was remarkable for its periods of drought, during the summer and autumn months, and, in this year, all larvae were found very low down on the tree and well in under cover—a fact which I attributed to the parched state of the foliage.

The earliest date on which I have found larvae in the third coat—that is, after the second moult—is September 6th, and this date is consistent with the normal instar periods of a larva hatched out about July 31st from an ovum deposited on July 17th.

Hibernation.—It is in this stage that the larva usually enters into hibernation. The period between the date of the second moult and dormancy may vary to a remarkable extent, according to the year. The normal date of retirement to the stem is between the 21st and the end of October, at which date the larvae have assumed the third coat from thirty to forty-five days. Between 1933 and 1935,

however, larvae might be found commonly on the foliage well after the third week of November, and in 1934 up to quite the end of that month. This, at first sight, appears to be the more remarkable, since it was in these years that the larvae passed the second moult at the earliest dates. They were thus in the hibernating stage for any period from forty-five to eighty days.

I think, as regards this larva, we are apt to construe the word "hibernation" in too strict a sense—that of a state of torpor—instead of in its primary meaning, "to pass the winter". Hibernation commences when the larva ceases to feed, and that is very shortly after the second moult. The fact that the larva makes no growth at all after it passes this moult is indicative of the fact that it has ceased to feed and is already "hibernating". Were it to continue feeding longer it would, of necessity, have to moult again before hibernation. This is contrary to the law of economy, although very occasionally it does happen (see below). The retirement of the larva to the stem is coincident with the fall of the leaf. In some years the foliage remains on the tree very much longer than in others, with the result that the larvae are correspondingly later in retiring to the stem. Some subtle instinct seems to guide them as to how long it is safe for them to remain out on the foliage, since retirement is not effected until the very latest moment. At the same time, although the larva remains out on the leaf, we must not lose sight of the fact that it is already "hibernating".

(To be continued.)

NOTES AND OBSERVATIONS.

EARLY REAPPEARANCE OF *POLYGONIA C-ALBUM* AT SEVENOAKS.—A *Polygonia c-album*, in very good condition, was observed on March 6th, flying around a big clump of crocus blooms here. This early rise from hibernation is no doubt to be accounted for by the phenomenal fact that this date marked the sixth successive day of continuous warm sunshine without wind or cloud in this part of England.—M. P. LATTER; Weald Place, Sevenoaks, Kent.

RAPID DEVELOPMENT OF A TROPICAL BUTTERFLY.—Many tropical species of butterflies pass through their early stages with astonishing rapidity, and more especially is this the case amongst the Pieridae, but I think the rapid development of two ova I saw laid outside in the jungle here by a ♀ *Appias lyncida* beats all records. These ova were laid about mid-day on December 18th, 1937; they hatched in less than 48 hours on the morning of December 20th; they both hung up for pupation on December 28th, and were already pupae very early in the morning of December 29th, producing two very fine

males on January 4th, 1938. So that they were only 2 days as ova, 8 days as larvae, and 7 days as pupae, thus making it a period of only 17 days from the date when the ova were laid to the emergence of the butterflies. They were laid on the very young leaves of *Capparis micracantha*, and the larvae were fed exclusively on that plant.—M. E. FOUNTAINE, F.R.E.S.; Angkor (Cambodge), Indo-China, January 6th, 1938.

POLYGONIA C-ALBUM IN LEICESTERSHIRE, 1936 AND 1937.—*P. c-album* seems to have increased its range here in the last two years. Two were seen at Bardon Hill, in North-east Leicestershire (lat. 52° 43', alt. 700 ft.) on April 10th, 1936. On April 18th, 1936, two more were seen at Ambien Wood in east Leicestershire. Unfortunately later observations could not be made during 1936, and it is impossible to say what subsequent brood there was. In 1937 two or three were seen in west Leicestershire on August 2nd, and another was observed in a Leicester garden a few days later. Is there any evidence as to when this insect migrates? Immediately before or after hibernation, or at its first summer brood?—H. A. BUCKLER.

STATUS OF MIMAS TILIAE IN THE MIDLANDS.—Notes appeared in the *Entomologist* (1937, 70 : 43, 60, 91) on the rarity of *M. tiliae* in Staffordshire. The *Victoria History of Leicestershire*, 1907, gives it as "rare", Prof. J. W. Carr's *Invertebrate Fauna of Nottinghamshire* also says "rare"—amplified in the supplement to "two or three every year". I knew from personal experience that it was reasonably frequent in Northamptonshire, where I had dug the pupa under elms. I therefore did a little intensive elm-digging around Leicester, and soon found that it was quite common—three pupae per short afternoon being about the average. I have taken it at Wymeswold and near Burton-on-Trent, within a mile or so of the Notts and Staffs borders respectively. Previously only two or three of this species in the imago state had been observed here in three years, and these on lime trunks, in town gardens. Can it be that *M. tiliae* prefers lime in the town and elm in the country? Probably our friends in the above counties have tried digging elm, but if not, it might be worth while. Incidentally we find *M. tiliae* easier to rear on elm than on lime, though the larvae will eat either readily.

For the last three years I have been trying to compile an up-to-date list of the Lepidoptera here. I should be grateful for any records of occurrences of Lepidoptera in Leicestershire since 1907 that anybody may be able to let me have.—H. A. BUCKLER.

PTILOPHORA PLUMIGERA IN KENT.—I was interested in Mr. de Worms's note on *Ptilophora plumigera* in the January number, as the fifteen males that he says were taken in mid Kent were presumably those taken by my son and myself. November 7th and 8th seem to have been red-letter nights for this species. It was on the 8th that the big number were taken in the Cotswolds, and the 7th,

which was the night that Mr. de Worms did his good work in the Ashford district, was also our best date. An important evening engagement compelled us to pack up at 8.15, but by that time we had already taken nine males, three of them just before leaving. The cold spell following did not finish the season in our case, and the species will apparently brave all the elements. On November 24th four males were taken on a night that turned so cold after sundown that when we finished at 7 o'clock the sheet was frozen hard to the ground, and when torn up almost stood on end like a piece of plywood. The last specimen of the year was taken in a really heavy deluge of rain at 5.40 on December 1st, and, like all the rest, was in condition equal to bred. I had been told that *plumigera* came up to the sheet like a bullet, but this was not our experience. Half of them did not fly at all, but approached the light by fluttering along the short turf on which the sheet was placed, and when arriving thus on the sheet settled down to rest. The others flew up with weakish flight, perhaps a little stronger than a *Hibernia*, but certainly with nothing of the strength of *Himera pennaria*, which came along from time to time. In our locality *plumigera* had obviously fed on the orthodox maple and not on sycamore. Our sheets were placed almost in the shadow of a group of large maples just outside a wood, and a neighbouring hedgerow was full of small maple bushes. These latter we searched in the hope of finding females ovipositing, but without success.

There were not a great many other moths at light,—just a few—*Cerastis vaccinii*, an odd *Orthosia macilenta*, two female *Asteroscopus sphinx* (no males), about a dozen male *Poecilocampa populi* and a few common autumn geometers. The last night (December 1st), in the rain deluge, was remarkable for a large number of *Cheimatobia boreata*, which flew round the lamp persistently, in spite of the down-pour, when no other geometer was seen. The only other moths on this last night besides these *boreata* and the *plumigera* were two worn *populi*—not a specimen even of *C. brumata*.—RUSSELL JAMES; Lynton House, Bishopswood Rd., Highgate, N. 6, February 24th, 1938.

THE BROCKLEHURST COLLECTION.—The extensive collection of British Lepidoptera formed by Mr. W. S. Brocklehurst of Bedford came up for sale at Stevens's Auction Rooms on February 8th last. It contained long series of many species as well as a good many specimens of rare and extinct—as far as Britain is concerned—species, together with several fine aberrational forms. As usual large numbers of Noctuae and Geometrae were practically given away, but on the whole good prices were realized, in one or two instances exceptionally good.

The first lot of interest were two brown-tipped ♂ *Leptidea sinapis* (var. *ganarew* Frohawk), which were sold for £2. Another fine pair (the ♀ of this form appears to be rare) realized no less than £5 5s.; a third lot consisting of two fine ♂♂ was bought for £3 15s.; in the writer's opinion these prices were too high, as a good many of this

form have been taken, mostly in the west of England in recent years. The first example of this variety was taken by the late A. B. Farn at Ganarew in Herefordshire in 1914; this specimen, which incidentally is in the writer's collection, is figured by Frohawk (*British Butterflies*, 1, pl. 8, fig. 16). A nice ♀ *Argynnis paphia*, though not perfect, was cheap at £2 2s.; a very perfect gynandrous *paphia*, left side ♂, right side ♀, went for rather less than usual at £9. A good *Nymphalis antiopa* taken in Suffolk in 1872 realized £1 1s.; another rather poor specimen of this butterfly was bought for 10s. The *Apatura iris*, nice specimens, put up in lots of four were cheap enough at 2s. 6d. each; asymmetrically bleached ♂ *Maniola jurtina* at £1 2s. 6d. was not dear, which is more than can be said about a *Coenonympha pamphilus* ab. *pallida*, which realized £1 15s.; large lots of *Coenonympha tullia* (*davus*) of about 50 specimens in a lot were thrown away at an average price of 6s. 6d. a lot. The *Lycaena dispar*, which were fairly good specimens, went at very low prices, ranging from £1 1s. to £2 2s. each for the ♂♂, the highest price being given for a nice underside with data. A small ♀ at £1 10s. was a gift to the buyer; another at £2 5s. was also a bargain; the third, a huge female, realized £6 10s. There were very few striking aberrational forms amongst the very long series of *Lysandra coridon*: two examples, fairly well striated on the fore wings, realized rather more than they were worth at £2 5s.; a much finer *antico-striata* ♂ was cheap at £3 15s.; a ♀ of a whitish ground-colour realized all it was worth at £3; the four lots of var. *syngrapha* put up in six and seven specimens in a lot were cheap enough at an average price of 3s. 6d. each. Typical *Maculinea arion* in lots of from 13 to 16 specimens in each were cheap at prices ranging from 26s. to 32s. 6d. a lot; a very interesting ab. *basijuncta* together with two good ab. *imperialis* of this species were a bargain to the buyer at £2 2s. There was nothing else amongst the butterflies which calls for any comment.

The first interesting lot amongst the moths were some fine bred *Celerio galii*; these fetched a good price at an average of 6s. each. A fairly good *Daphnis nerii* taken by C. Howitt at Perth in 1881 was brought for £4. The writer always doubts if purely accidental things like *nerii*, which cannot fairly be called a British species, are worth the high prices they generally realize. A good *Synanthedon tabaniformis* from the Burney Collection together with several *Seisia bembeciformis* and *S. apiformis* was a bargain at 17s. for this great rarity. A good *Utetheisa pulchella* taken at Folkestone was bought at 32s. 6d.; another, also taken at Folkestone, realized £2 5s.—good prices in both cases. A large *Arctia caia* with a good deal of white on the fore wings was not cheap at £5 5s. Two very interesting *Cerura bifida*, one very dark-banded and the other a fine ♀ with the band broken, were probably worth the £4 10s. they went for. The gem of this collection undoubtedly was a very fine and perfect *Notodonta tritophus* (*phoebe*) taken by Mr. Brocklehurst at Bedford on May 12th, 1907, and recorded in the *Entomologist* for 1908. This specimen realized no less than £13—a very high price in spite of its great rarity. Two lots of fine bred *Acronicta strigosa*, seven and

eight specimens in each lot, were cheap at 18s. a lot; two rather poor ♂ *Petilampa palustris* included with a large lot of other Noctuae were cheap enough at 10s.; nice *Rhyacia alpina* went at an average price of 2s. each. Three fine *Grapholitha furcifera (conformis)* at £1 15s. and another three at £2 2s. went for a good deal less than this species has been realizing at sales for several years; four fine *Cucullia gnaphalii* fetched a good price at £1 6s. This collection contained no less than three specimens of *Pseudophia lunaris*; two very perfect examples with the data "Brighton 1907 W. Salvage" went at 30s. each; the third, not nearly so good a specimen as the other two, and recorded in the *Norwich Natural History Society Transactions*, 3: 28, realized the astonishing figure of £14. The writer refrains from any comment on these *lunaris*; he rather feels like the Irishman's parrot which "could not talk but was a devil to think". A fine *Catocala fraxini* taken at Aberystwith in 1906 was cheap enough at 10s.; another good specimen went for 14s. Nine specimens of the now extinct *Ptychopoda circellata* were given away at 7s.; two fine *Aplasta ononaria* taken at Folkestone realized £2; two others not so good went for £1 17s. 6d. Six fine *Eustroma reticulata* at 17s. and another half-dozen at 16s. were rather cheaper than they have been going for at recent sales. Some very fine and interesting suffused forms of *Gonodonta bidentata* in lots of five and six specimens in each lot went at prices ranging from 15s. to 32s. 6d. a lot.

The Micro-Lepidoptera in large lots were given away at considerably less than the cost of the pins, half-a-dozen lots in some cases having to be lumped together before a buyer could be found even at 3s. A huge lot of duplicate insects nearly all in good condition and well set were also practically given away at a few shillings, largely owing to the fact that a great many of them were without data.

There were two other small lots of British Lepidoptera for sale by unnamed vendors included in this sale. The first contained a good many varieties of *Abrazas grossulariata*, which went on the whole at very low prices, the highest price being 21s. given for a fine ab. *nigrocretacea*. Two poor *Lycaena dispar* went at 18s. for a ♂ and 10s. for a ♀; a perfect ab. *antico-obsoleta* of *Lysandra bellargus* together with a pathological *C. pamphilus* and a pathological *M. tithonus* were a gift to the buyer at 10s.; three specimens of the *extensa* form of *bellargus* were a bargain at 12s.; a good ♂ *Argynnis lathonia* with data was cheap at 21s., and another also with data went for £1.

The third vendor's insects were all varieties of British Butterflies, there being some very fine ones, chiefly *Lycaenas*, amongst them. A nice white *Argynnis selene* in fine condition was a bargain at £1 15s.; a fine melanic *Polygonia c-album* went for 12s.—cheap enough in spite of its rather poor condition; two other more or less melanic *c-album* were not dear at 10s. each. Two fine gynandrous *Polyommatus icarus* of the Irish race realized £3 10s. and £4 10s. respectively—their full value in the writer's opinion, considering the fact that a good many Irish gynandrous *icarus* have been taken in recent years. One collector is reported to have taken no less than a dozen examples

in one season. A very fine ab. *obsoleta* of *icarus* together with an ab. *pallida* of this species were a bargain to the buyer at £1 4s. A beautiful ab. *obsoleta* of the Irish race of *icarus* realized £5; this form is rare in the Irish race. A fine and very perfect ab. *antico-radiata*, a male of an exceptionally dark ground-colour, was well worth the £5 it went for. £2 2s. was given for a good ab. *livida* of *Lysandra coridon*—a bargain for a specimen of this rare form; five ab. *fowleri* went at an average price of 15s. each, quite enough; a perfect ab. *plumbescens* realized £2, and another was sold for £2 15s.—not too good a price for this rare form of *coridon*.

A large cabinet of 50 drawers in good condition was a gift to the buyer at £18; a 30-drawer cabinet by Crockett realized £24; a 15-drawer cabinet went for its full value at £12 10s. The prices realized at this sale on the whole were good, some very good, and some absurd.—W. R. S.

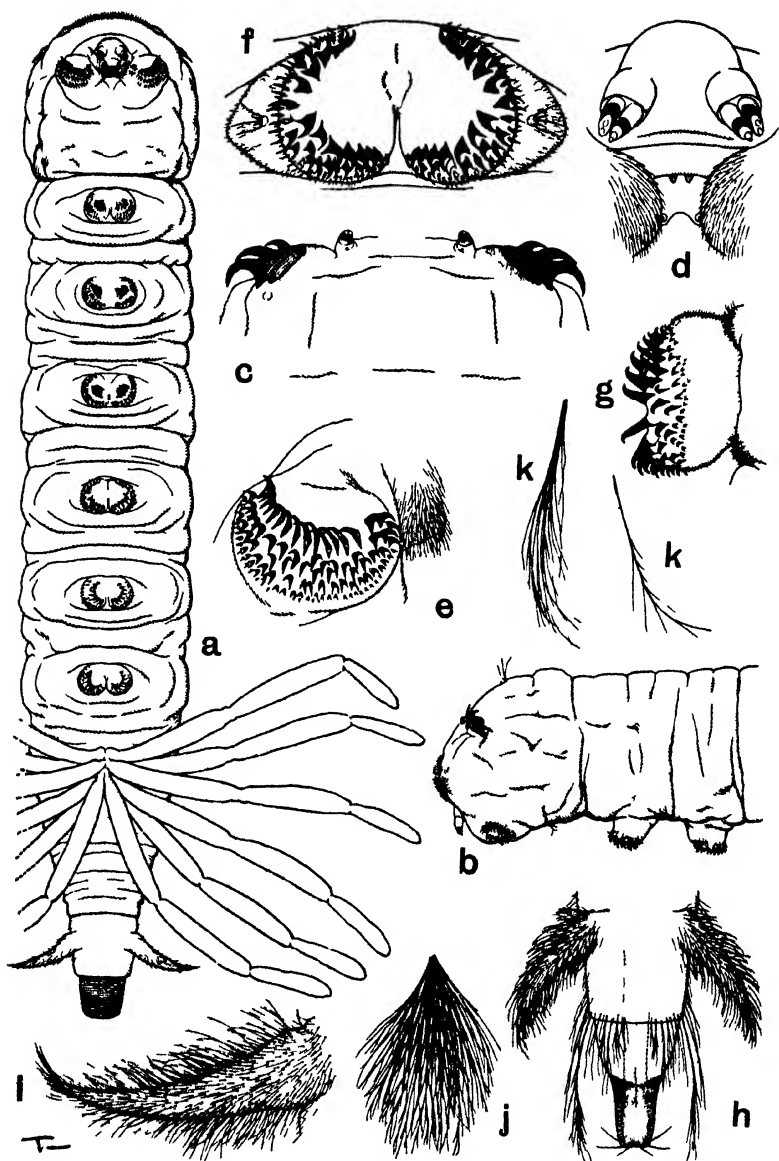
SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*Thursday, December 9th, 1937.*—The President in the Chair.—Mr. A. W. Roswyn, of Forest Hill, was elected a member.—Mr. Andrews exhibited specimens of the scarce Dipteron *Myopites blottii*, a Trypetid, from Yarmouth, I. of Wight; Mr. Sevastopulo, a collection of moths taken at light at Darjeeling, and read notes on the method and the results of his collecting there. Mr. Wallis-Norton gave an account of his method of setting insects which had been sent in papers from abroad. Dr. Hewer then showed cinematograph films on the screen with appropriate remarks. The subjects depicted were the life-history of the Amoeba, the earthworm, marine worms and the sea-urchin.—HY. J. TURNER (*Hon. Editor of Proceedings*).

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—*December 1st, 1937.*—Mr. R. Tait, President, in the Chair. An interesting paper, well illustrated by specimens, was given by Messrs. T. H. Hanson and James I. Alfrey, entitled A Fortnight's Collecting in the Bournemouth District. The holiday started on July 31st, 1937, the journey being by car in really fine weather. Besides collecting in Branksome Chine and the New Forest, expeditions were made to Swanage, Studland Heath, Corfe, Lulworth, Hod Hill, and the Isle of Wight. Thirty-two different species of butterflies were identified, which included: *Pararge aegeria* L., *Satyrus galathea* L., *Eumenis semele* L., *Argynnis aglaia* L., *Argynnis paphia* L., *Polygonia c-album* L., *Limenitis camilla* L., *Plebejus argus* L., *Aricia agestis* Schiff., *Polyommatus icarus* Rott., *Lysandra coridon* Poda, *Thecla quercus* L., *Colias croceus* Fourc., *Gonepteryx rhamni* L., *Adopaea actaeon* Rott., *Hesperia comma* L. Moths taken included: *Calothysania amata* L., *Plemyria bicolorata* Hufn., *Selidosema ericetaria* Vill., *Lasiocampa quercus* L., *Zygaena filipendulae* L. Sugaring produced: *Acronycta rumicis* L., *Mania*

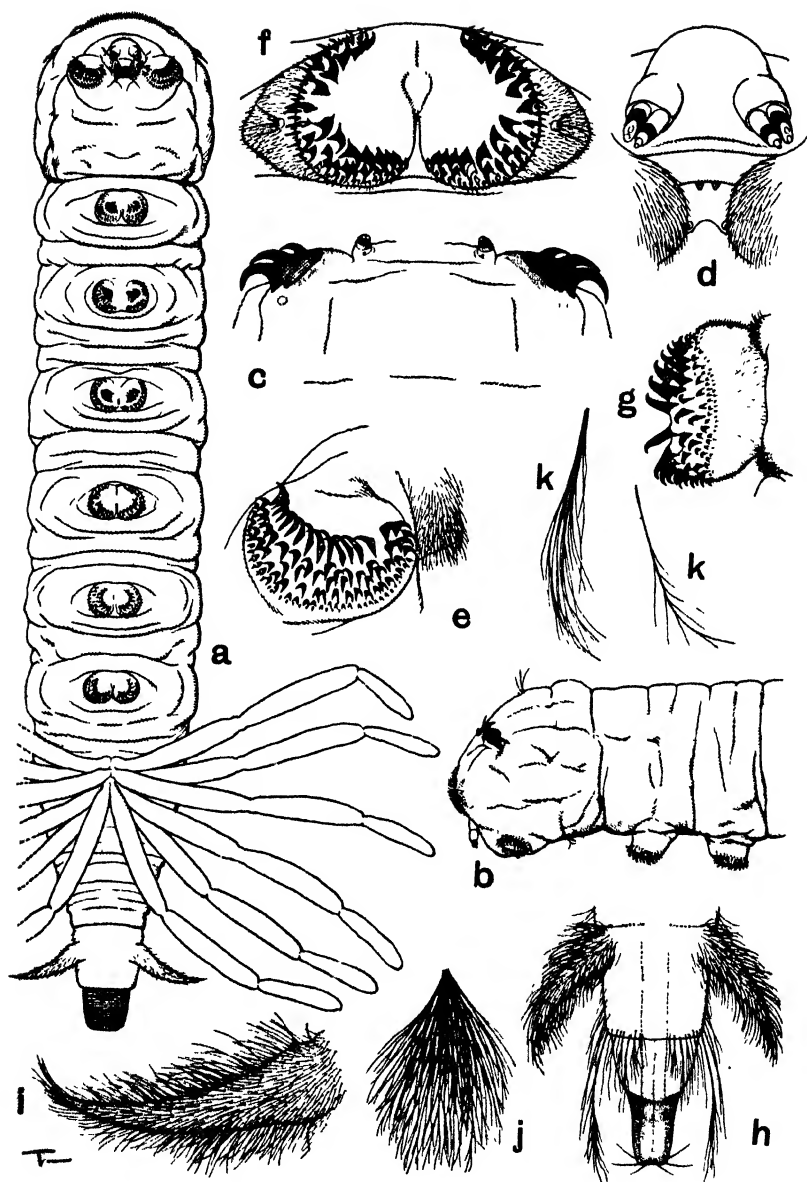
maura L., *Hadena meticolosa* L., *Euzoa puta* Hb., *Graphiphora pronuba* L., *Triphaena ianthina* Esp., *Caradrina matura* Hufn., *Catocala nupta* L. By using cyanide, and with the assistance of one of the Rangers, a hornets' nest was taken in the New Forest, and the holiday generally yielded other Hymenoptera, as well as Coleoptera, Diptera and Orthoptera. Exhibits were shown by the following members: W. Buckley, interesting moths from his garden at Cheadle Hulme, including *Orthosia lota* Clerck, *Polia protea* Borkh., *Plusia festucae* L., *Smerinthus populi* L., *Deilephila elpenor* L., *Cerura vinula* L., *Hepialus lupulinus* L.; H. Britten, Coleoptera taken in 1862 by H. H. Higgins, mostly in the West Lancs district; B. H. Crabtree, a few aberrations of *Lysandra coridon* Poda shown in a box lined with black paper; G. W. R. Bartindale, Coleoptera from Oxford, including *Agonum sexpunctatum* L., *Staphylinus similis* F. from Dovedale; H. N. Michaelis, *Peronea mixtana* Hb. from Cheshire; L. Nathan, *Deilephila elpenor* L., Heaton Mersey, *Deilephila porcellus* L., Southport, *Smerinthus populi* L., Southport, *Smerinthus ocellatus* L., Sale, Manchester, a small beetle, *Lasioderma serricorne* F., found among ground-nuts (*Arachis hypogaea* Linn.) at Moss Side, Manchester, November, 1937.—L. NATHAN, *Asst. Hon. Secretary*.

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held at Florence House, Heston, on November 29th, 1937, Mr. H. Donisthorpe in the Chair. Members present in addition to the Chairman: Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin, Dr. Harry Eltringham, Mr. R. W. Lloyd, Major Philip P. Graves. Visitors present: Dr. Karl Jordan, Capt. N. D. Riley, Mr. W. Rait-Smith, Mr. W. H. T. Tams. The guests were received by Mr. Donisthorpe and the Misses Kirk. The meeting was called for 6.30 p.m. The Chairman's series of albums of photographs and reminiscences were inspected with much interest. Supper was served at 7.30, after which Dr. Jordan described an interesting phenomenon observed by him in Angola. Below the first escarpment, about 50 miles from the coast, a brook of clear water fell over a ridge of igneous rock, forming a waterfall about 3 ft. high and 10 in. thick at the top of the fall. On the vertical surface of the ridge washed by the fall a Parnid beetle was found in some numbers. When scraped off the rock with a stick the beetles were washed away, but were soon seen flying back towards the waterfall. They dived into it, and in spite of the considerable force of the falling water, safely reached their original position under the waterfall and rather higher up than the point where they plunged into it. Dr. Jordan suggests that the difference in pressure between the outer and inner strata of the falling water drove the torpedo-shaped beetle inward and upward like an air-bubble, the beetle being surrounded with air held in place by a dense coat of short hair, and the momentum of the plunge shooting the beetle deep enough into the fall that the pressure on its tail by the falling water was greater than the pressure on its head. The party broke up from 10.30 onwards, a very pleasant evening having been spent.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).



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COE-LARVA OF *CALLICERA YERBURYI* VERRALL.



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COE-LARVA OF *CALLICERA YERBURYI* VERRALL.

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REDISCOVERY OF *CALLICERA YERBURYI*, VERRALL (DIPTERA: SYRPHIDAE): ITS BREEDING HABITS, WITH A DESCRIPTION OF THE LARVA.

By R. L. COE,

British Museum, Natural History.

(Plate I.)

Callicera yerburyi was first discovered by Colonel J. W. Yerbury at Nethy Bridge, Inverness-shire, in August, 1904, four females alone being taken, and Verrall briefly described that sex in the same year. A more detailed description appeared in 1913. The male is still unknown.

Excluding the present record, examples of this beautiful *Syrphid* fly have since been taken on four occasions only, despite the fact that most dipterists collecting in Scotland in late summer have made the species a special object of search. The following captures are recorded: 1 ♀, Loch Rannoch, Perthshire, 5.viii.1907 (J. W. Bowhill); 1 ♀, Nethy Bridge, 9.viii.1911 (J. W. Yerbury); 1 ♀, Nethy Bridge, 12.viii.1911 (J. J. F. X. King). A single female taken by P. Harwood at Granish, Inverness-shire, in August, 1929, is apparently unrecorded.

C. yerburyi is the most northerly representative of the genus *Callicera*, appearing later in the year than the majority of described species, all of which are rare wherever they occur. Nothing has hitherto been known about the earlier stages of flies of this genus, although various opinions on the subject have been placed on record. Sack, who assigns the genus to the subfamily *Chilosiniinae*, suggests that the larvae "probably feed on the flowing sap of diseased trees", while Rondani earlier queried whether the larvae are "phytophagous as in allied species". Verrall (1901) placed the genus in the subfamily *Chrysotoxinae*, but referred to the possibility that the peculiar structure of *Callicera* might entitle it to the rank of subfamily. The combined characters of a terminal arista, distinct eye-margins, unusual facies, and small cross-vein situated before the middle of the discal cell tend to support this idea, apart from any unique larval features.

It will be seen from the preceding remarks that considerable interest and speculation attach to the genus *Callicera*, especially in Britain to the rare Scottish species *yerburyi*. The rediscovery of that species by the present writer, while collecting in an extensive

pine forest near Braemar, Aberdeenshire, last August, has resulted in its breeding habits being ascertained.

At 5 p.m. on August 2nd a yellowish, bee-like fly was seen entering a decayed cavity at the junction of the twin trunks of an ancient Scotch pine, and when the net was held over the spot, the fly flew upwards into it. The specimen proved to be a female of *Callicera yerburyi*. The cavity penetrated the main trunk to a depth of at least 2 ft. and was partly filled with resinous water containing a mass of decomposing pine-needles, cones and pieces of bark. Further observation resulted in the capture of another female, which at 5.20 p.m. flew down swiftly from a height into the hole.

On the following day a constant watch was kept from 11 a.m. until 5 p.m. One female entered the cavity at noon, another at 2 p.m., and two entered together at 3.30 p.m. These were netted with the exception of the first arrival, which, after entering the hole, was observed to thrust its ovipositor repeatedly under loose scales of the cavity-lining a few inches above the water-level. Through too close study the fly escaped, but examination of the exact spot where oviposition evidently took place resulted in the discovery of a batch of whitish ova. These ova numbered about a dozen, and each measured roughly 1.2 mm. in length, being of the normal elongated-oval, delicately sculptured *Syrphid* type. They were deposited side by side and perpendicular, as in those of an *Eristalis* species mentioned by Metcalf.

The next morning was spent in the vicinity of the tree, and towards noon two more females entered the hole within a few minutes of one another. These were netted, bringing the total captures to seven on three consecutive days, the weather being fine and warm on each occasion. A week after leaving the locality the eggs (which had been placed in a small tube with some of the resinous water) hatched, but the larvae succumbed through inevitable agitation while moving from camp to camp. On emergence the tiny larvae suspended themselves from the water-surface by the short posterior respiratory tube, and the presence was noted of several anal flabellae similar in appearance to those of *Eristalis* and allied larvae.

After returning to London I had sent me a generous sample of the decaying material from the tree-hole, together with some of the resinous water. Fourteen *C. yerburyi* larvae in various stages of growth were present, but unfortunately the majority had died during transit by post. Two of the survivors were almost newly emerged, while the remainder included several well-developed examples. All were placed in a large glass jar, containing a thick layer of the decomposing matter covered by over an inch of resinous water.

The tiny larvae hung from the surface of the water by the posterior respiratory tube, and maintained a wriggling movement. As the larvae grow their tracheae develop to an unusual degree and they become subaqueous, ascending to the surface for respiration at longer and longer intervals. During that process the later-stage larva assumes a perpendicular position, thrusting the posterior appendage slightly out of the water, and clinging with the sucker-like prolegs to any *débris* within handy reach. After renewing its supply of air, the larva rapidly works down into the mass of decaying material, and can only be studied when it approaches the side of the jar. The anal flabellae may then be seen at times protruding about a half-inch from the body; by muscular action they undulate gently with a regular motion, bending freely at the joints in a posterior direction; during their extrusion the larva remains stationary, perpendicular and head downwards. When completely extruded the flabellae are inflated, possibly with gases. At such times I have seen them suddenly deflate and partially withdraw into the body, while excrement is passed along the intestinal tract and expelled from the orifice between the two sets of organs. They are not normally extruded during the act of respiration (*i. e.* when the larva is at the surface of the water).

Antipathy for any bright light is exhibited by these larvae, and their breeding-place was noted to be sheltered from the sun's rays by surrounding trees, except for a brief spell towards evening.

The food of the larva apparently consists of decaying organic particles.

DESCRIPTION OF THE LARVA

In general structure the larva shows affinity to the "rat-tailed" *Eristaline* type fully described by Metcalf, with certain striking and important modifications, the most obvious being the brevity of the posterior respiratory apparatus. The larva of *Pocota apiformis* Schrank, described by Aubertin, has this air-tube considerably shortened, thus approaching in form the species now under consideration.

The larva of *Callicera yerburyi* is greyish-white in colour, and a practically mature example measures 2.3 cm. (Pl. I, A). The body is subcylindrical in shape, broad and truncated anteriorly. It is apparently composed of twelve segments, and bears seven pairs of prolegs armed with numerous radiating curved spinules, arranged in four or five rows. The thoracic (*i. e.* first) pair is separated from the rest, and the component legs are placed well apart (Pl. I, E); those of the remaining pairs, however, lie so closely together as almost to appear fused (Pl. I, F and G).

The anterior extremity of the prothorax is covered with closely-massed, brown-tipped spinules (Pl. I, B). These spinules are rather longer than those occurring in a similar position in various "rat-tailed" larvae examined.

The oral aperture is situated ventrally between the thoracic legs, and the rudimentary mouth-parts are guarded at either side by closely-massed recumbent fine whitish hairs, some of which become brownish in the mature larva (Pl. I, D). The fleshy antennae lie just in front of the mouth-opening, and are somewhat divergent: they point downwards and the tips are bifurcated. The two apical projections of each antenna are dissimilar, and appear slightly chitinated towards the base.

The extensive tracheal system can be traced from the anterior dorsal spiracles to the tip of the posterior respiratory tube.

The anal aperture is situated ventrally behind the seventh pair of prolegs, equidistant from the latter and the posterior end of the body in the later-stage larva. Twelve eversible, bladder-like, finger-shaped processes, with three segments, issue from the anal orifice (Pl. I, A). They are arranged in two sets, side by side, and complete retraction is effected by means of strong muscles connecting them to the body-wall. Gatenby has described and figured similar structures occurring in an unidentified *Syrphid* larva, and they are apparently common to all the *Eristalinae* and allied forms. Réaumur, who first drew attention to these anal flabellae, stated that their extrusion coincides with the expulsion of excrement, although he failed to discover their particular function.

Eighty years later Dutrochet made a similar statement, adding the opinion that the processes form part of the intestinal system and actually expel waste matter from the body. In several preserved examples these organs contain granular particles, but no outlet exists, however, for such material. From my own observations of the living *C. yerburyi* larvae, recorded earlier in this paper, it seems possible that their function is to recondition the air in the trachea. It has been suggested by others that they draw from the water certain elements essential to the well-being of the larva.

The two anterior respiratory cornua, which are reddish-orange in colour, project from the dorsal surface of the prothorax, and are placed nearer the median line, and slightly more forward, than in

EXPLANATION OF PLATE.

A. Larva, ventral view, $\times 6$. B. Anterior extremity of same in profile, $\times 6$. C. Antero-dorsal trifurcate appendages, showing respiratory cornua. D. Antennae and mouth-parts. E. Thoracic proleg. F. Abdominal proleg (fourth abdominal segment). G. Same in profile. H. Posterior extremity of early-stage larva, showing papillae. I. Abdominal papillae (much enlarged). J. Tuft of hairs occurring posteriorly on abdomen of early-stage larva. KK. Pinnate hairs occurring as in J.

Eristaline and allied larvae (Pl. I, c). Three chitinized, reddish, backwardly curved spines, fused into a common base, occupy the normal position of the anterior spiracles (Pl. I, c). These powerful trifurcate appendages facilitate the passage of the larva through the masses of *débris* during its subaqueous existence. They occur in a rather weak form in younger larvae, but whether present in the first stage has not yet been ascertained.

The posterior respiratory appendage is short, its length in the nearly full-grown larva being 3.5 mm. It is lightly chitinized, reddish-orange in colour, becoming paler towards the base. The posterior spiracles lie, somewhat separated, at the tip, which in the later-stage larva is devoid of the radiating tufts of hairs present in most *Syrphid* larvae of aquatic and semi-aquatic habits. The appendage of the young larva, however, bears at the tip a ringlet of six fine pale hairs (Pl. I, n).

Numerous short whitish hairs are scattered about the the body, and these become longer beyond the anus. They are supplemented posteriorly in the early-stage larvae by long, silky, filamentous hairs, some of which are distinctly pinnate (Pl. I, кк), while others, occurring laterally on the anal segment and the preceding one, form a fine brush and arise from a common base (Pl. I, j). These arrangements probably assist the young larva to remain at the surface of the water.

Many short integumental processes may be traced on the body, and a pair of large whitish papillae occur just before the base of the posterior respiratory tube (Pl. I, i). These papillae are downwardly directed, and taper steadily from a stout base to a bluntly pointed tip, being covered with short outstanding pale hairs. An interesting feature of the early-stage larva is the prolongation of the body beyond these posterior papillae, as in the case of the adult larva of *Pocota apiformis*, though not to the same extent as the latter.

Finally, the main structural differences in the almost mature *C. yerburyi* larva from the "rat-tailed" *Eristaline* type may be summarized thus: brevity of posterior respiratory apparatus; absence of radiating hairs at tip of latter; higher development of tracheal system within the body-wall; presence of chitinized trifurcate appendages occupying usual position of anterior respiratory cornua, these latter structures being placed nearer the median line and slightly more forward; approximation of component prolegs of abdominal segments; more numerous strongly-developed spinules occurring on prolegs.

REFERENCES.

AUBERTIN, D. (1928).—"The Larva of *Pocota apiformis*, Schrank," *Entom.*, 61: 151.

- BOWHILL, J. W. (1913).—"Rare Scottish Flies (Syrphidae)," *Scot. Nat.*, 17: 117.
- DUTROCHET, M. (1818).—"Suite des Recherches sur la Metamorphose du Canal alimentaire chez les Insectes," *Journal de Physique*, 86: 197.
- GATENBY, J. B. (1921).—"Description of a peculiar unidentified Dipterous Larva possessing a number of enigmatic truncate abdominal organs," *Trans. Ent. Soc. Lond.*, 54: 524.
- METCALF, C. L. (1913).—"The *Syrphidae* of Ohio," *Ohio State Univ. Bull.*, 17: 17.
- RÉAUMUR, M. (1738).—*Mém. l'Histoire des Insectes*, 4: 453.
- RONDANI, C. (1844).—"Species Italicae Generis *Callicerae*," *Ann Soc. Ent. Fr.*, 18: 67.
- SACK, P. (1928).—*Die Fliegen*, No. 31, 4 (*Syrphidae*): 111.
- VERRALL, G. H. (1901).—*British Flies*, 8 (*Syrphidae*): 639.
- Idem* (1904).—"Callicera yerburyi, n.sp.; A British *Syrphid* New to Science," *Ent. Mo. Mag.*, 40: 229.
- * *Idem* (1913).—"Descriptions of New Species of the *Syrphid* Genus *Callicera* (Diptera)," *Trans. Ent. Soc. Lond.*, 46: 325.
- YERBURY, J. W. (1913).—"Recent Captures of *Callicera yerburyi*, Verrall," *Scot. Nat.*, 18: 142.

* Published posthumously by Mr. J. E. Collin.

EARLY APPEARANCES, 1938.—It is interesting to note that *Pieris brassicae* was on the wing in Sevenoaks this spring on March 9th, whilst on April 10th I saw a specimen of *Euchloe cardamines* here—an early date for this species.—WILLIAM E. BUSBRIDGE; "Gresham", Bradbourne Park Road, Sevenoaks.

WICKEN FEN FUND.—This fund is raised annually by entomologists and other nature-lovers to assist in defraying the expenses incurred by the custodians of Wicken Fen, the National Trust, in administering the Fen, preserving the fauna and flora, and in providing a watcher. The Fen is unfortunately very inadequately endowed, and its maintenance places a severe strain on the resources of the custodians, who for many years have had to contribute a considerable sum of money annually towards its upkeep. Of late, owing to the lack of funds for cutting, etc., the reed has greatly increased its growth, to the detriment of other plants, and, therefore, the fauna dependent upon them. In consequence of the representations and actions of certain entomologists who are members of the Committee of Management, supported as they have been by the Royal Entomological Society of London, an effort is being made to remedy this by cutting the reed during the summer, thereby weakening its growth, and ultimately eliminating some of it, but of course the extent to which this can be done depends entirely upon the amount of money available. It is earnestly hoped, therefore, that every nature-lover who possibly can will contribute towards this very desirable object, and will send his or her contribution as soon as possible to the Hon. Treasurer, W. G. SHELDON, West Watch, Oxted, Surrey, who will be pleased to send permits for observation or collecting to subscribers on application. The amount subscribed in 1937 was £119 17s. 0d.

A MIGRATION OF CABBAGE WHITE BUTTERFLIES IN
HERTFORDSHIRE IN MAY, 1937.

BY MRS. K. GRANT,

Rothamsted Experimental Station.

DURING the summer of 1937 the Cabbage White Butterflies, *Pieris brassicae* L. and *Pieris rapae* L., have been unusually common in Great Britain and on the Continent. Mass flights have been seen in other parts of Europe, particularly in Germany, but in England the flights have been thin, though sometimes of considerable duration. Many of these flights have been briefly recorded in the *Entomologist*, and it is thought that the following account of a migration that passed through Harpenden in May, and lasted, with intervals, for a fortnight, may be of sufficient interest to entomologists to warrant its description in detail.

On Whit Monday, May 17th, I noticed that both *P. brassicae* and *P. rapae* were unusually numerous in St. Albans, both sexes flying in dozens about the streets and feeding on horse-chestnut blossoms and other flowers. I could detect no sign of directional movement, although I watched at one point for about half an hour.

The next day I crossed Harpenden Common on the way to lunch, and, in the walk of a little over a quarter of a mile, was passed by several insects of both species apparently slowly drifting north. *Rapae* were the more numerous. This made me determine to take counts, but from the 19th until the 22nd the weather was dull, few or no butterflies were to be seen, and no observations could be made.

May 23rd, a Sunday, was fine, and I saw about half a dozen of each species between St. Albans and Harpenden. They were in good condition and both sexes were present, but I could find no indication of directional flight. On the 24th I again saw a number of both species from the bus between St. Albans and Harpenden between 9.30 and 10 a.m., and on this occasion I got a strong impression of northward movement. In the lunch hour I looked out for them carefully, and once more found that they were slowly drifting to north or north-west. Four or five of each species passed me between Rothamsted Laboratory and the village, a distance of about a quarter of a mile.

In the afternoon I returned to the Common at 2.40, and picking an open place surrounded by trees, against whose green foliage the butterflies showed up clearly, I settled down to make a careful count of the number flying in each direction. From this position the insects could be seen over a front of perhaps 150 yds. The

method used was to pick out a north-south line from my seat to a certain building with a compass, and to judge the angle to this line made by the flight of each insect as well as I could by eye. Measuring the compass direction of several buildings and trees around me was a considerable aid to accuracy. The insects were recorded on a diagram already ruled with lines to represent the various compass directions. A dart was marked on the appropriate line to represent the direction of each insect. Fig. 1 shows the result of one hour's observation on May 24th. Forty-nine butterflies passed me, *rapae* considerably predominating. Of these, forty-three had a northerly component in their flight, and five a southerly component; one flew due west. This is a clear enough demonstration of northward movement. About half of the butterflies flew more than 10 ft. above the ground, and there was a tendency for the *brassicae* to fly higher than the *rapae*. When the butterflies flew over a tarred road which was rather strongly heated by the sun, it was amusing to see them lifted and whirled round by small thermal air-currents; this did not seem to interfere with their sense of direction. Most of the insects seemed to fly in a fairly straight line, but some made the wildest zigzags, turning aside to examine flowers or to chase other butterflies. In nearly all cases, however, these zigzags carried them farther and farther north after each divergence; the *brassicae* on the whole flew straighter than the *rapae*. The wind was a gentle breeze from the south-south-west, according to the Rothamsted wind indicator, and is recorded in Fig. 1, as in the other figs., by an arrow pointing in the appropriate direction, the number of vanes on its tail corresponding to its strength on the Beaufort scale, in this case force 3, i. e. 8-12 m.p.h.

The migration continued on May 25th. Two *brassicae* were seen flying north in the Dunstable Road, St. Albans, at 9.25 a.m.; six more, mostly *brassicae*, passed from south to north across St. Peter's Street while I waited for a bus (5 mins.). In Harpenden the flight was somewhat denser than on the previous day. From 1 to 1.15 p.m. 34 insects were counted on Harpenden Common, twenty-six having a northerly component in their flight (Fig. 2). Nearly half of them were *brassicae*. The wind was recorded on the Rothamsted indicator as somewhat lighter than on the previous day, but out on the Common it seemed stronger and the insects flew lower, *rapae* in particular keeping close to the ground. Watch was resumed in the same place at 2.40 p.m., and in the half-hour between then and 3.10 fifty-nine insects were counted, *brassicae* slightly predominating (Fig. 3). Forty-seven had a northerly component. There was a considerable tendency for the butterflies to fly in loose groups of four or five with several empty minutes between each group. Later in the afternoon a count was made on Great Field, a

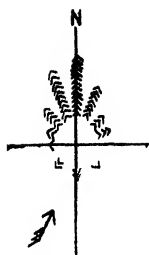


FIG. 1.

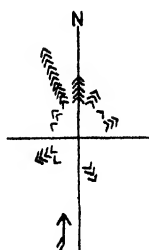


FIG. 2.

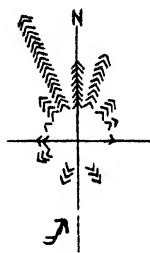


FIG. 3.

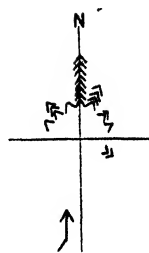


FIG. 4.

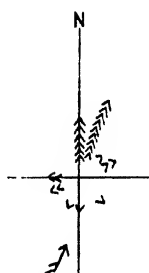


FIG. 5.

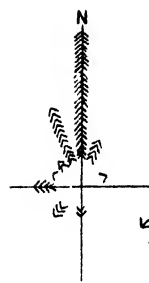


FIG. 6.

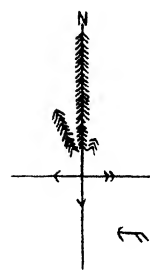


FIG. 7.

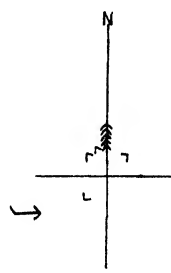


FIG. 8.

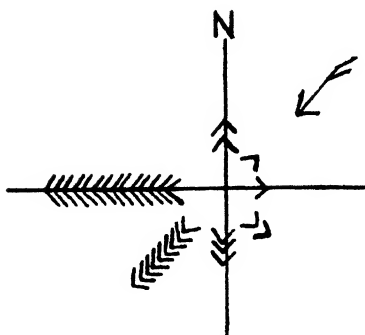


FIG. 9.

- FIG. 1. Harpenden Common. 24.v.37. 2.22-2.42 p.m.
 FIG. 2. " " 25.v.37. 1-1.15 p.m.
 FIG. 3. " " 25.v.37. 2.40-3.10 p.m.
 FIG. 4. Great Field, Rothamsted. 25.v.37. 4.45-5.15 p.m.
 FIG. 5. " " 27.v.37. Noon-12.30 p.m.
 FIG. 6. " " 28.v.37. 11.50 a.m.-12.20 p.m.
 FIG. 7. " " 29.v.37. 10.50-11.5 a.m.
 FIG. 8. St. Albans, Verulam Fields. 30.v.37. 3.40-4.20 p.m.
 FIG. 9. Harpenden Common. 29.vii.37. 2.22-2.42 p.m.

part of Rothamsted Farm about half a mile from the previous observation point, between 4.45 and 5.15 p.m. By this time the flight had thinned out a lot, and only twenty-two insects were seen in half an hour. The predominance of northerly flight was marked, only two of the butterflies having a southerly component in their flight (Fig. 4).

May 26th was dull in the morning, but a few butterflies were seen, apparently drifting north. From 2 to 3.30 p.m. the weather was much brighter, and I went out on to the allotments at the back of the Laboratory to watch the butterflies. The *brassicæ* were still migrating northwards at the rate of about two per minute, but the *rapæ* seemed to have stopped moving altogether. Dozens of them were present, feeding on the flowers of broccoli plants, and some of the females were ovipositing. No *brassicæ* were seen ovipositing, though many of them stopped to feed a while on the flowers. Sometimes there appeared to be a struggle going on in the insects to obey two instincts at once; they seemed to be straining against the migratory urge, rather like a dog on a leash, and would fly a little off their route to bring themselves closer to the flowers, then find themselves unable to stop. They would go past for a yard or two, then turn back and feed, but too restless to settle comfortably would fly on in a few seconds, only to be tempted aside in the same way by the next group of flowers that they passed. I caught specimens of each species; *rapæ* were easier to catch, since their flight was random and unhurried. The *brassicæ* were flying at a speed of 8 or 10 m.p.h. and were not easy to catch, especially as it was necessary to avoid stepping on to seed-beds and growing plants on the allotments. The sex ratio of those caught was 3 males to 2 females of *brassicæ* and 7 males to 2 females of *rapæ*. Females of both species contained well-developed eggs, apparently ready for oviposition. Both sexes were in good condition.

On May 27th *brassicæ* was still migrating north across Great Field (Fig. 5). Twenty insects passed the observation point between 12 and 12.15, but in the following quarter of an hour cloud covered the sun and only five more were seen, still making north or north-east.

May 28th was hot and sunny, and the *brassicæ* migration continued; as many as fifty-four insects passed in the half-hour from 11.50 to 12.20 (Fig. 6). It was interesting to watch them passing a belt of trees (oak and elm) which grew across Great Field, directly in the path of most of the butterflies. Over the field they flew from 3 to 6 ft. from the ground, but about 50 ft. from the trees they seemed to become aware of the barrier ahead of them and rose high in the air. This seemed the more extraordinary since grazing cattle have eaten the lower branches from the trees until a

flat ceiling has been formed about 10 ft. from the ground, and very few of the butterflies were flying in such a line that they would have had to deviate to pass between the trunks. On this day the wind was light and variable, at one time being diagonally against the flight of the insects. These wind changes seemed to have no effect on the direction of the migration.

May 29th: *Pieris brassicae* continued to migrate northwards, forty-two insects passing the observation point on Great Field from 10.50 a.m. to 11.5 a.m. Slight south-easterly breeze, force 2 on the Beaufort scale, *i. e.* speed 4-7 m.p.h. A dozen specimens were taken, the sexes being equal in number.

May 30th, a Sunday, showed a great diminution in the number of migrants. Between 3.40 and 4.10 p.m. nine insects passed a point in Verulam Fields, St. Albans, eight of them having a northerly component in their flight direction. The weather was hazy and warm, with very little sun. Very light airs from the west, force 1 on the Beaufort scale.

On May 31st migration had apparently ceased altogether, and was not resumed in the days following. The number of *brassicae* present fell considerably, although dozens could still be seen flying at random on the allotments. Copulation was not observed, although the sexes were beginning to take an interest in one another, and the females were haunting the green cabbages which they had previously ignored. *Rapae* adults were also common, and first-stage larvae were to be found on the cabbages. Two pairs of the latter species were seen *in cop.*

Later in the summer, on July 29th, another flight of Cabbage Whites was watched by Dr. C. B. Williams. During the late morning an unusual number of these butterflies was seen in the neighbourhood, and between 2.22 and 2.42 p.m. a count was made on Harpenden Common. During this time thirty-two butterflies passed the observation point, twenty-three of them having a westerly component in their flight, four an easterly component, and five flying either due north or due south. The wind was a light breeze from the north-east, the weather warm with some sunshine and a little haze and cloud. The butterflies flew more slowly than in the May migration, keeping a speed of about 4 m.p.h., and flying from 1 to 10 ft. from the ground: the majority flew about 4 ft. up. A rosette for this flight is shown in Fig. 9. This westerly movement seems to have been of considerable extent, since many reports have been received of westerly movements taking place about this date, and I myself, two days later, observed large numbers of *brassicae* and *rapae* moving westwards from the windows of a train in Northern France.

All the times given in this account are British Summer Time.

NOTES ON BRITISH ODONATA IN 1937.

By J. COWLEY, M.A., F.R.E.S.

For this year my personal observations were confined to Surrey and Sussex, and therefore it was not likely that species not hitherto recorded would occur; nevertheless *Libellula fulva* was found for the first time in Sussex—an indication of how little we know of the distribution of our small Odonate fauna even in the best worked home counties. The Ceratopogonid parasitic flies were watched for, but none were seen, nor was Dr. J. W. S. Macfie able to find them on Wicken Fen. To avoid repetition below the principal localities visited may be mentioned here: Basingstoke Canal, Byfleet, Surrey; Wey-Arun Canal, near Cranleigh, Surrey; River Arun, near Bedham, Sussex.

Platynemis pennipes (Pallas): Byfleet, July 3rd, two or three tenerals flying over the boggy ground well away from the Canal; Bedham, July 1st, frequent, ovipositing.

Pyrrosoma nympha (Sulzer): Byfleet, May 28th (adult and ovipositing), June 3rd; Charlwood, Surrey, May 29th (ad.); Cranleigh, May 30th; Bedham, July 1st. ♀-f. *melanotum* Selys: Byfleet, May 28th. ♀-f. *fulvipes* Stephens: Byfleet, June 3rd.

Ischnura elegans (Van der Linden): Byfleet, May 28th (adult and ovipositing), June 3rd, August 6th; Cranleigh, May 30th (juv. and ad.); Charlwood, Surrey, June 19th (1 ♀ juv.); Bedham, July 1st. ♀-f. *rufescens* Stephens: Byfleet, May 28th, June 3rd; Cranleigh, May 30th; Bedham, July 1st. ♀-f. *infuscans* Campion: Byfleet, May 28th, June 3rd, August 6th; Cranleigh, May 30th; Bedham, July 1st. ♀-f. *infuscans-obsolata* Killington: Byfleet, May 28th, June 3rd; Cranleigh, May 30th; Bedham, July 1st.

Enallagma cyathigerum (Charpentier): Wicken Fen, Cambs., July 18th (Dr. J. W. S. Macfie): Byfleet, August 6th.

Coenagrion pulchellum (Van der Linden): Byfleet, May 28th, June 3rd, August 6th. ♀-f. *nigrescens* Puschnig: Byfleet, June 3rd.

C. puella (Linnaeus): Byfleet, May 28th (adult and ovipositing), June 3rd, August 6th; Charlwood, Surrey, May 29th (ad.), June 19th, July 14th, 28th; Cranleigh, May 30th; Norwood Hill, Surrey, June 4th, 26th; Bedham, July 1st; Albourne, Sussex, July 6th. ♀-f. *annulatum* Selys: Byfleet, June 3rd. I believe that I have never found the blue-ringed (*annulatum*) females of *puella* and practically ringless (*nigrescens*) females of *pulchellum* in any localities except those where the two species occur together; if this is indeed correct, it is curious that it is only where the two species

fly together that a proportion of the females of each species outwardly resembles the usual female of the other, while there seems to be no such marked variation in the males. I have always found it possible to assign the females to the proper species by the form of the posterior lobe of the prothorax, which in my experience gives a clear-cut distinction without intermediates, whatever the colour-pattern may be. The question whether these female forms do only occur in the presence of the species which they resemble requires confirmation.

Erythromma najas (Hansemann): Byfleet, May 28th (adult and ovipositing), June 3rd, August 6th; Cranleigh, May 30th; Bedham, July 1st.

Agrion splendens (Harris): R. Mole, Betchworth, Surrey, May 27th (juv.); Byfleet, May 28th (juv.), August 6th; Bedham, July 1st.

Brachytron pratense (Müller): Byfleet, May 28th (ad.), June 3rd (ovipositing).

Aeshna grandis (Linnaeus): Byfleet, August 6th, ovipositing.

A. cyanea (Müller): Norwood Hill, Surrey, June 26th (3 exuviae, 1 recently emerged ♀), July 13th (1 ♂ exuviae), 25th, August 1st, 5th, 7th, 8th (21 exuviae 9 ♂, 9 ♀, 3 sex not determinable, one skin was nearly 6 ft. from the water's edge and 10 in. above the ground), 10th (1 ♀ exuviae), 12th, 25th (oviposition first noted); Coldharbour, Dorking, Surrey, September 23rd (ovipositing).

Anax imperator Leach: Charlwood, Surrey, July 14th.

Cordulia aenea (Linnaeus): Byfleet, May 28th (ad.), June 3rd (ovipositing), August 6th (few); Cranleigh, May 30th.

Somatochlora metallica (Van der Linden): Byfleet, May 28th, a single very teneral male, evidently on its first flight. No other examples were seen on this or on later visits, unless they were mistaken for *C. aenea*; but all the Cordulines examined at close quarters were *C. aenea*.

Libellula quadrimaculata Linnaeus: Byfleet, May 28th (juv.), June 3rd (ovipositing); Cranleigh, May 30th.

L. depressa Linnaeus: Charlwood, Surrey, May 29th (1 ♂ subad.); Cranleigh, May 30th (ad.); Byfleet, June 3rd; Norwood Hill, Surrey, June 4th.

L. fulva Müller: Bedham, July 1st, a single very adult and worn female to which attention was directed by its fluttering in the long grass by the edge of the river, apparently having difficulties in taking flight. This is the first record of the species for Sussex, while East Kent, where it was discovered in 1935 (Gillman, 1936, *Entomologist*, 69: 18; *Ent. Rec.*, 48: 22), is the only other modern record for the southern counties. The Arun seems a suitable habitat for

it, so that it is to be hoped that it breeds regularly there ; it was possibly a mile or so further down the river, according to information kindly supplied by Mr. D. E. Kimmins, that *Gomphus vulgatissimus* (Linnaeus) was found (Kimmins, 1933, *Entomologist*, 66 : 170), but I did not see this species nor any other specimens of *L. fulva* in following the river for some distance. These two species may well occur on other parts of the Arun, as *G. vulgatissimus* was found 25 years ago at Fittleworth, adjacent to the Arun and Rother (F. W. and H. Champion, 1913, *Entomologist* 46 : 78), and they should be carefully preserved in such an interesting locality.

Sympetrum striolatum striolatum (Charpentier) ; Byfleet, August 6th (ovipositing).

S. sanguineum (Muller) : Wicken Fen, Cambs., July 18th (*Dr. J. W. S. Macfie*).

Norwood Hill House,
Horley, Surrey ;
January 15th, 1938.

MIGRATION OF POLYGONIA C-ALBUM. —Mr. H. A. Buckler in the April issue of *The Entomologist*, p. 91, asks for evidence as to when *P. c-album* migrates. On searching my records I find the following : " 26 September, 1933, Dorking, 19 *Vanessa atalanta* and one *P. c-album* all migrating to the South." " 25 September, 1935, Epsom and Ashted, 2 *P. c-album* migrating to S.S.E." I think that these are the only occasions on which I have observed the species migrating during the sixty years that I have been interested in such movements —A. A. W. BUCKSTONE ; 90, Pams Way, Ewell, Surrey.

EARLY VANESSA ATALANTA AND EUCHLOE CARDAMINES.—The following may prove of interest regarding the habits of *V. atalanta*—whether it hibernates or not in England. To-day I watched a male *atalanta* sunning itself for some ten minutes, flying round and repitching in almost the same spot. The time was 4.10 p.m., the place, the top of the hill above Bow Brickhill Church, Bucks, 3½ miles S.E. of Bletchley. Height above sea-level, 450 ft. The *atalanta* was on the edge of a large beech wood, with a lot of old trees full of holes and crevices. I see that in my diary for 1912, 1913, 1914, March 30th was the earliest date in those years on which *atalanta* appeared in Crackington Haven in North Cornwall. May 25th is our earliest date hitherto in this area to my knowledge. I have been breeding some *Euchloë cardamines* in a zinc enclosure in this garden—protected in a sense by the zinc—but exposed to sun, rain and frost, and under snow from February 12th to 25th. Yet one emerged on March 25th, a second on March 29th, and a third is showing orange through the pupa case.—SIDNEY H. KERSHAW (Col.) ; Alderman's Place, Aspley Heath, Bletchley, Bucks, March 30th, 1938.

THE LIFE STORY OF *APATURA IRIS*.

BY STANLEY MORRIS.

(Continued from p. 90).

When the critical time does arrive, the larva leaves its "seat" and makes it way up the stem to the first convenient forked branch. Here it spins a silken web, immediately beneath the fork, at a point where the rind has formed a roughish excrescence at the time that the branch divided, and between this excrescence and the smooth surface of the branch itself. The shady side of the stem is always chosen, and the general aspect is north or north-east. Here the larva rests, so closely pressed against the stem that at a casual glance it is part and parcel of the stem itself. The head of the larva is always uppermost, and the V-shaped horns are exactly on a level with the base of the fork.

The silken pad spun by the larva beneath the fork has quite a silvery appearance and shows up distinctly when vacated. Curiously enough, there is a small larva of, I think, a species of *Micro*, only about 5 mm. in length, which spins a web precisely similar to the hibernating web of *iris*, and in much the same position; the only difference lies in its use: the one serves for a couch upon which the larva rests, the other for a covering to protect the tiny speck of life within it. The coincidence is surely a case of protective assimilation. Once the larva has taken up its position against the stem, it does not move again until the following spring, but it may be some weeks yet before it becomes fully dormant. This is evidenced by the fact that a sharp blow on the stem of the tree, immediately beneath the larva, will invariably cause it to raise its head and look around. Once, however, the larva becomes fully dormant, its colour is changed to match its surroundings, and then a very keen pair of eyes is required to detect it, so wonderfully is it camouflaged against the grey bark of the stem.

In some years the larva does not retire to the main stem at all, but instead takes up a position on the upper part of the branch, against a young bud, and here its procedure is similar to that described in the foregoing paragraph—the body of the larva being close-pressed between the stem and the bud, with the V-shaped horns exactly coinciding with the angle formed between the bud and the stem. So far as my experience goes, whenever larvae are found in hibernation against the bud it is invariably the forerunner of a mild winter. Whether this is merely coincidence or the outcome of some subtle instinct on the part of the larva I will not venture an opinion, but the fact remains. Possibly the occurrence

is more common than we are led to believe, by reason of the fact that larvae thus hibernating are very much more difficult to detect than those which take up a position normally in the forked stem. There are many buds on a branch, as compared with suitable forked stems in the tree itself.

Frohawk (*Natural History of British Butterflies*, p. 175) mentions the larvae hibernating in the curled leaf. I have never come across an instance of this, and I think that his observations must refer to larvae kept in confinement, when possibly the facilities for normal hibernation were not available. Larvae kept in confinement on the living tree will sometimes take up a position on the wire stays of the covering, and even on the muslin itself, and will pass the winter successfully in such unusual positions. They must be extremely hardy, as no amount of frost seems to have the slightest effect upon them, and I have seen a larva cut out in mid-winter completely embedded in ice formed in the fork of the branch through melting snow.

Although normally hibernation takes place after the second moult, larvae will sometimes enter into hibernation after having moulted only once, and occasionally they will feed on and pass a third moult before so doing. Such instances, however, are the exception.

The latter instance raises an interesting point. It is an established fact that *iris* will occasionally produce a second brood in the season (see below), and undoubtedly such insects are the outcome of larvae which have fed on after passing the second moult. When such a condition obtains the larva must perforce pass the third moult abnormally, and having done so, it finds itself faced by a difficult alternative—either hibernation or maturity. We have already seen, in the instance of a larva having overstepped, as it were, the bounds of prudence, that hibernation can be successfully accomplished in this advanced stage. What, then, when climatic conditions are equal, prompts one larva to adopt the course of hibernation and another to feed on again and attain maturity? The problem is an interesting one, but I can offer no solution.

Towards the middle of March, or earlier, the hibernating larva awakes and begins to assume its natural colour again. It may, however, be some weeks yet before it leaves its hibernaculum, although it is now fully aroused from its long sleep. I think this awakening is brought about by the rising of the sap in the branch. If larvae are cut out on the stem during the winter, the branch should never be allowed to get dry. This is more often than not fatal to the larvae, which will not thrive on the dead wood. The branches should be placed in a jar of water and kept in the open air; by this means their latent energy is preserved.

The larva leaves its hibernaculum about the end of March or early April on the first few warm days experienced around these dates. It makes its way to the outside branches and here takes up its position on the opening foliage. In some years, when the foliage is backward, it may have to wait for some time before finally establishing itself. In such case the larva takes up a position against the opening bud, and waits for this to unfold. If the time be long it will occasionally feed on the tips of the buds.

Intermediate moult. Occasionally some larvae which have passed the winter normally after the second moult will moult again almost as soon as they commence to feed. This moult is not a recognized one, but appears to be intermediate between the normal second and third moults. It happens, when at all, in very forward seasons, when the larva awakes to the full leaf, and when the urgency for this direct change is obvious, in that the hibernating coat is altogether out of keeping with the fresh green foliage amid which it thus suddenly finds itself. The process of this moult is similar to the second and occupies from three to four days. When completed, the larva appears in bright green livery, in keeping with the young foliage. The yellowish lateral markings have now given place to well-defined white stripes, and the wart-like protuberances on the dorsal surface have disappeared. I have never found any cast skin after this moult, so that it would appear this is eaten. The "couchant" leaf has been liberally spun over with silk. I have known this moult take place as early as the first week of April, when the larvae have not come out of hibernation until March 26th.

Third moult. The date on which the larva "sets" for the third moult is the most variable of all stages, and the moult itself is perhaps the most critical. The earliest date I have recorded for this moult is April 18th, 1933, the latest May 29th, 1932, so that the period may extend over nearly six weeks and the larva may be anything from 220 to 260 days old. The period occupied in this moult is also very variable. I have known one larva take as long as nine days and another not more than three. A fair average time is from five to six days.

The position selected for this moult is similar to the last stage, that is, on the upper surface of the leaf. Frohawk (*Natural History of British Butterflies*, p. 177) mentions that for the last two moults the larva usually selects the under-surface of the leaf. I have never known an instance, in a state of nature, where this has been so, and I think that his observations must refer to larvae kept in confinement, when possibly the "sleeve" has been too exposed to direct sunlight, or placed in such a position that the natural proclivity of the larva could not conveniently be gratified.

(To be continued).

THE FLYING-HABITS OF BUTTERFLIES WHEN PAIRED.

BY B. C. S. WARREN, F.R.E.S.

SOME eighteen years ago I published a few records of the flying-habits of paired butterflies (*Ent. Rec.*, 32:218-223). I was then only able to give records of forty-four species, but since have accumulated data relating to a further twenty-five species, as well as many cases confirming former records. This may not seem a very large number, considering the years that intervene, and it certainly could have been larger but that during seven seasons I devoted myself wholly to making notes on species of the genus *Erebia*. However, this further small instalment may be of interest, as during this period, I do not think any other records have appeared in the *Entomologist's Record* or this magazine.

In my former paper I pointed out that my observations supported Donzel's theory that the flying-habit is the same in all species of a genus. This, on the whole, is corroborated by my fresh data, the one or two exceptions suggesting that there is something requiring adjustment in our conception of certain genera. I feel now, however, that the habit is something far more fundamental than this idea of its being a generic characteristic suggests, for it appears to be a family habit which has become slightly modified in certain cases. Of course as yet the records apply to an insignificant number of species (69), but still they are enough to be very suggestive, and there must be very many others known though perhaps not published. It would be easy to double this number, or more, if collectors would take the trouble to note, and record, the cases which come to their notice; the results would be of great interest. It is of course necessary to note at the actual time any observations made. The simplest way to get the desired information is to net any pairs which may be found, and identify the ♂ (or ♀) and then let them fly. With the knowledge of which sex is which it is easy to note which is flying.

In the following records the species placed in brackets were recorded in my former paper, and are included merely in confirmation. The sex given is the one which flies.

SATYRIDAE.—In this family, so far as I know, the ♀ only flies. Two doubtful records of the ♂ doing so were mentioned in my last paper (*l.c.*, p 222). I unfortunately have no fresh records of the two species concerned (*Agapetes galathea* and *Aulocera proserpina*), but as I previously recorded three cases of the ♀ of *A. galathea* flying, and recalling that no certain case of the ♂ flying has been recorded in the family, I feel no doubt that these two species are no exception to the general rule.

(*Pararge maera*, Ofen Pass, August 10th, 1922, ♀; Gondo Gorge, Simplon Pass, July 14th, 1923, ♀.)

Erebia stirius stelviana, Ofen Pass, August 11th, 1922, ♀.

E. alberganus celo. (two pairs), Laquintal, Simplon Pass, July 11th, 1923. ♀ flew in each case.

(*E. gorge*, Grammont, Valais, August 8th, 1925, ♀.)

E. claudina, (two pairs), Mallnitz, Carinthia, July 15th and July 30th, 1937. ♀ flew in each case.

Hipparchia neomiris, Tattone, Corsica, August 10th, 1926, ♀.

Pyronia cecilia aphrodite (= *ida* Esp.), Vecchio, Corsica. August 2nd, 1926, ♀.

(*P. tithonus*), (three pairs.) Tattone, Corsica, August 10th, 1926. ♀ flew in each case.

Coenonympha arcania darwiniana, Laquintal, Simplon Pass, July 9th, 1923, ♀.

C. arcania neochides (= *satyrion* Esp.), Mallnitz, Carinthia, July 19th, 1937, ♀.

NYMPHALIDAE.—Strangely enough, records in this great family are limited to the *Argynnis*s. Among these the unusual habit of both sexes flying at times is known in *Argynnis paphia*, *A. aglaia*, *A. adippe* Rott. and *A. niobe*. Otherwise, so far as the few records go, only the ♀ flies, with a single exception.

Argynnis maja, Vizzavona, Corsica, August 10th, 1926, ♀.

(*A. aglaja*, Mallnitz, Carinthia, July 8th, 1937. ♂ and ♀ flew alternately.)

A. titania jugurtha (= *amathusia* Esp.), Mallnitz, Carinthia, July 11th, 1937, ♀.

A. pales palustris, Piz Tschierva, Grisons, July 11th, 1922, ♀.

Euphydryas aurinia glaciegenita (two pairs). Piz Tschierva, Grisons, July 11th, 1922. ♀ flew in each case.

(*Melitaea helvetica*, Zerne, August 3rd, 1922, ♀; La Combballaz, Vaud, July 28th, 1925, ♀.)

M. varia (two pairs). Piz Tschierva, Grisons, July 11th, 1922. ♀ flew in each case.

M. asteria, Piz Palpuogna, Grisons, July 22nd, 1922, ♀.

M. diamina, Ofen Pass, July 31st, 1922, ♂. The only record, so far, of a ♂ flying among the species of this genus, or any genus of *Argynnis*s except the instances where both sexes fly alternately.

LYCAENIDAE.—In this family the prevailing habits are that among the "Coppers" the ♀ flies, while in the "Blues" the ♂ does. There are some interesting exceptions, however, and having no new records of "Coppers" I would just point out that the exception in their case, previously recorded, is *Lycaena subalpina*, in which the ♂ flies. It is interesting to recall that both in the character of the markings of the underside, and the colour of the ♂ upperside, this

species, superficially, more closely resembles many of the "Blues" than such species as *L. phlaeas* or *L. hippothoë* in which the ♀ flies.

Among the "Blues" those species I previously recorded as exceptions, in that the ♀ flies, are: *Maculinea arion*, *Cyaniris semiargus* and *Aricia chiron*, the latter doubtfully. I can now add another record of *A. chiron* which removes the doubt.

(*A. chiron*, Geisspfad Pass, July 20th, 1924, ♀.)

Also another record of *Cyaniris semiargus*.

(*C. semiargus*, Ofen Pass, July 31st, 1922. This pair flew twice: the first time the ♀ flew, the second the ♂. This is the first record of both sexes of a species flying, apart from the well-known instances of the four large *Argynnis*.)

To these I can add one more species in which the ♀ flies.

Cupido minimus (two pairs), Laquintal, Simplon Pass, July 9th, 1923. ♀ flew in both cases and there was no suggestion that the ♂ might also fly.

This record rather suggests that the inclusion of *C. minimus* in the same genus as *C. sebrus* may be a mistake. I have previously recorded that in *C. sebrus* it is the ♂ which flies.

Other new records are:

Polyommatus eros, Pontresina, Grisons, July 13th, 1922, ♂.

Lampides boeticus, Tattone, Corsica, July 23rd, 1926, probably the ♂, but there remains some slight uncertainty.

Plebejus argus. (two pairs), Mallnitz, Carinthia, July 4th, 1937. ♂ flew in each case.

I have further records of *Lysandra coridon* (five pairs), *L. argester*, *Agriades glandon* (= *orbitulus* Hb.) and *Agrodiaetus damon* (two pairs). In all these cases the ♂ flew, as previously recorded.

PIERIDAE.—I have extremely few records in this family, seven in all, but of these in six cases the ♂ flies, and in one (*Aporia crataegi*) the ♀.

Recent records are:

Pieris brassicae, Mallnitz, Carinthia, July 31st, 1937, ♂.

P. napi, Mallnitz, Carinthia, July 14th, 1937, ♂.

Colias phicomone, Binn, July 18th, 1924, ♂.

C. croceus, Vivario, Corsica, August 3rd, 1926, ♂.

PAPILIONIDAE.—*Parnassius apollo*, Simplon Pass, July 5th, 1923, ♀. A very short flight only, suggesting that this species only flies when paired if it is actually compelled to do so. On previous occasions I had been unable to make it fly. The present record is also considerable support to those views, based on scale-formation, which hold closer affinity for *A. crataegi* with *Parnassius* than the *Pierids*.

HESPERIIDAE.—Very few records exist, but in all the ♀ flies.

Pyrgus serratulae, Tschitta Pass, July 29th, 1922, ♀. My only previous record of this species was inconclusive.

P. carlinae, Laquintal, Simplon Pass, July 17th, 1923, ♀.

(*P. alveus*, Albrun Pass, July 16th, 1924, ♀.)

These records bring the list of species I have observed up to sixty-nine. Another dozen or so could probably be found in old records such as Donzel's (*Ann. Soc. Ent. France*, 1837), but a far larger number of new records are much to be desired, and, as I said before, could easily be obtained if every collector would make a habit of recording his observations. It would be still better if the Editor would consent to keep any records sent to him and publish them together at the end of each season. [I should be pleased to do this—ED].

NOTES AND OBSERVATIONS.

MEATHOP MOSS, WESTMORLAND.—This Nature Reserve is under the charge of the Society for the Promotion of Nature Reserves. Admission is now obtainable by permit only. Permits can be obtained from the Hon. Secretary, Society for the Promotion of Nature Reserves, British Museum (Natural History), Cromwell Road, London, S.W. 7. The dates on which applicants propose to visit the Moss should be stated when applying for permits. Permits should be handed to the keeper, Mr. JOHN LEE.—ED.

EARLY *PIERIS RAPAE*.—I saw *Pieris rapae* flying in my garden on the 12th inst. I have records since 1890 made mostly in East and West Sussex, and my previous earliest date was March 15th in 1932.

STANLEY MORRIS. Ranscombe, Fox Hill, Sturry, Canterbury, March 25th, 1938.

EARLY *VANESSA ATALANTA*. In view of the controversy which has raged over the question of *V. atalanta* hibernating successfully in this country, I thought you would be interested to know that I saw a specimen in my garden yesterday, March 31st. It was settled on the ground, only a few yards from me. Apart from a small chip out of the left hind wing, it was in perfect condition.—N. G. WYKES; Barnes Pool, Eton College, Windsor, April 1st, 1938.

VANESSA ATALANTA IN MARCH. I think the following undoubtedly is an instance of the hibernating of *V. atalanta* in this particular locality, as each year this species has been observed early in the year in the same place and has been previously found hibernating. I have just heard from Lord Bolingbroke kindly telling me of the interesting observations on the early appearance of *V. atalanta* he has made at Lydiard Tregose, N. Wilts; in all five specimens have appeared. The first one was seen on March 20th, others on the 22nd and 24th. The first one he captured. Three have been seen on the

wing simultaneously, while the other frequents the bank of a stream some quarter of a mile distant. The four were still on the wing when he wrote me on April 7th, saying their condition was then somewhat worn. They daily frequent the same place, which is a drive bordered each side by a wide verge of ground flora consisting of celandine and stinging-nettles, etc., the adjacent trees being elm and chestnut. Although we know that immigrants of both *V. atalanta* and *V. cardui*, which usually arrive on our southern coast during May or early June, select each year upon arrival certain spots to take up their quarters for a time, their early appearance *each* year at Lydiard Tregose points to their hibernation in the district.—F. W. FROHAWK; April, 1938.

EARLY BUTTERFLIES. --As a result of the exceptionally fine, warm weather of March, Mr. J. F. Thomas writes to me on March 28th, saying: "This morning brilliantly fine with N.W. 2 wind. I was walking under an inland old red sandstone cliff facing south and saw four species of butterflies: several small Tortoiseshells, four Peacocks, a small White (or maybe green-veined) and a Painted Lady . . . settled and sunned itself for some minutes . . . it was in perfect condition, colours bright and thorax covered with thick hair." The Rev. F. L. Blathwayt tells me he "saw a male Orange Tip on the wing in a sunny Taunton garden on March 31st this year". Also Lord Bolingbroke when writing me on April 7th says, 'I have just this moment seen a male Orange Tip flutter past the study window to provide yet another record for this extraordinary season'. F. W. FROHAWK; April, 1938.

THE EARLY SEASON. *Aglais urticae* and *Nymphalis io* were on the wing during the first week of March; *Pieris rapae* appeared on April 5th together with *Euchloë cardamines* (two males observed); on April 7th *Pieris rapi* and *Pararge aegeria* were flying together along a sunny bank and *Ematurga atomaria* among the heather on a neighbouring bog. THOMAS GREER; Sandhills, Dungannon, co. Tyrone, April 11th, 1938.

EARLY LARVAE. --Although hibernated outdoors, the first *Melitaea cinzia* pupated to-day. *Euphydryas aurinia* were pupating over a week ago. *Limenitis camilla* have been feeding for the past fortnight, and the most forward *Melitaea athalia* are nearly fully grown and should pupate within seven days, although the main batch have another skin to cast. G. B. OLIVER; High Wycombe, April 8th, 1938.

EARLY DATES, 1938. --It may be of interest to record that I took the following at light in the New Forest: April 1st, 3 specimens of *Eupithaecia irriguata*; April 2nd, 3 specimens of *Notodonta trepida*; April 5th, 1 specimen each of *Drymonia chaonia* and *Demas coryli*.--Rev. F. GOODWIN BRITTON; Addingham, Ikley.

UNUSUALLY EARLY APPEARANCES OF SPRING LEPIDOPTERA, 1938.—The remarkable and almost uninterrupted spell of fine weather during March brought out many species several weeks before their

normal date of emergence. The following records may be of interest: March 4th, *Brephos parthenias* (Ascot); March 11th, *Tephrosia bistortata*, all commoner Taeniocampidae (Surrey); March 20th, *Taeniocampa miniosa*, *T. populeti* and *Panolis piniperda* (Chiddingfold); March 23rd, *Aleucis pictaria* and *Eupithoea pumilata* (Leatherhead district); March 26th, *Pachnobia leucographa* (Lake district); March 29th *Selenia tetralunaria* (Byfleet); April 1st, *Lobophora polycommata* (Boxhill), many already worn; April 2nd, *Polyplocia ridens*, *Boarmia consonaria*, *Anticlea nigrofasciaria* (Wye Valley); April 3rd, *Euchloë cardamines* well out in Gloucestershire; April 8th, *Hesperia malvae* (Camberley). (G. M. DE WORMS; Milton Park, Egham. April 12th, 1938.

CURIOUS BEHAVIOUR OF *DANAUS CHRYSIPPUS*.—During the first week in January, on a somewhat windy day in the streets of Calcutta, I observed a reddish-brown tram ticket blown along by the wind. Scarcely had my eyes caught it, when a specimen of the above-named butterfly dashed downward, followed the ticket for some distance, and attempted to strike it at intervals. (Curiously enough, in the following week, when I was in the Maharajah's Palace at Mysore, another example of the same species flew inside and went through the same performance with paintings on the ceiling of the room. J. W. HESLOP HARRISON: King's College, University of Durham.

MACROGLOSSA STELLATARUM IN PORT SAID AND GIBRALTAR.—Early in December as I was examining the vegetation in Port Said a single specimen of this insect was noted sunning itself, as usual, along hot sunny walls, and leaving them at intervals to visit flowers of the Morning Glory (*Ipomoea* sp.), which were just then at their best. Later, in the last week in January, another example was observed in Gibraltar, in this instance attempting to probe *Calendula* and *Datura* flowers on the beach. J. W. HESLOP HARRISON.

DOUBLE OR SINGLE BROODED. I have often seen a note in the *Entomologist* from some collector recording the taking of some insect very late in the year, or at any rate long after its usual period of appearance, with the comment that as the specimen was quite fresh it must have been the product of a second brood. Then again certain moths are given in some text-books as double and in others as single brooded, as for instance *Notodonta dictaeoides* and *N. cuculla*. Now while it is well known that under certain conditions of weather a second brood is often produced by a usually single-brooded species, yet an experience I had last summer seems to suggest that the taking of a fresh example of an insect long after its usual period of appearance is no proof that it is the product of a second brood, and it may also account for the divergence of opinion as to whether certain species are single or double brooded. The experience to which I refer was as follows: I had a large batch of pupae of *N. dictaeoides* at the beginning of 1937, which had gone over a year; they started emerging in the second week in May and

continued to come out, 2 or 3 every few days, right on till the second week in August. I would emphasize the fact that it was not a case of the emergence of one or two out of their proper time, but a more or less continual emergence over a period of three months. The pupae were out of doors the whole time and had no special treatment. — C. RIPPON, M.A., F.R.E.S.; Red Lodge, Cold Ash, Newbury, Berks.

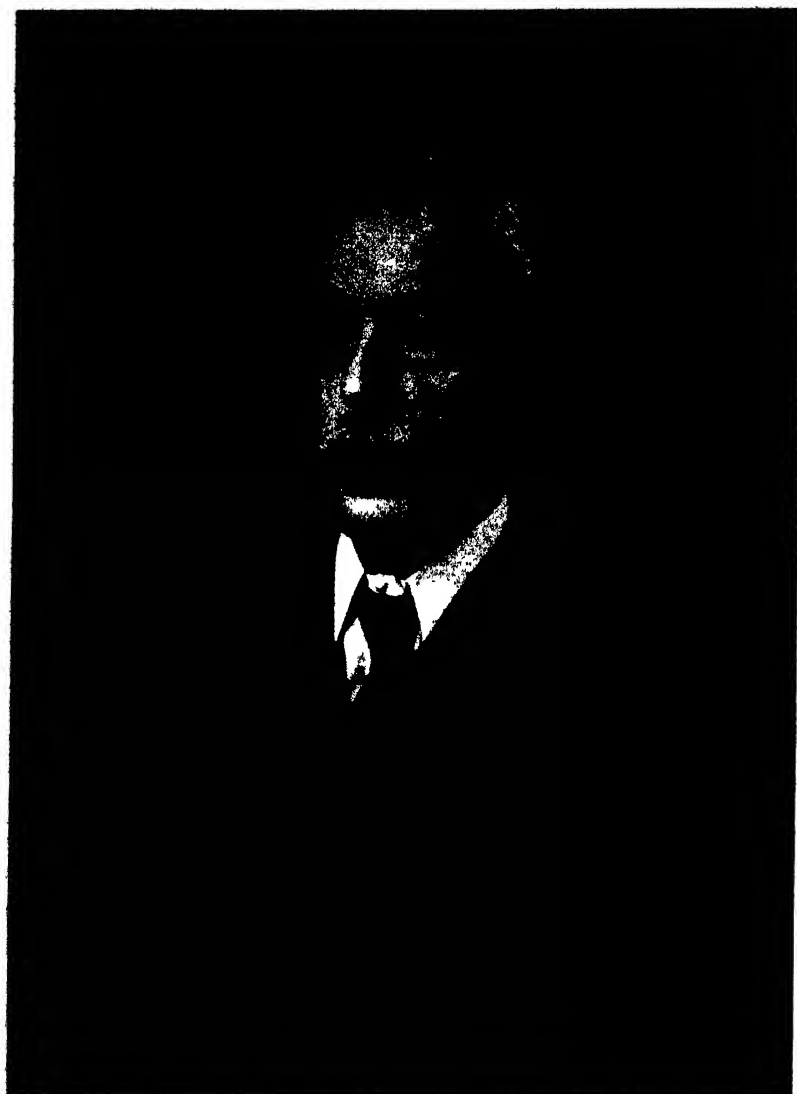
ASTEROSCOPUS NUBECULOSA.—Some time ago I contributed a note on the depth to which the larva of *nubeculosa* buries for pupation, and I am tempted to send another note *re* the life-history of this curious and interesting moth. It is of course a matter of common knowledge that it frequently passes long periods in the pupal state. In my experience not more than 2% ever emerge the first year; the majority as a rule come out after two years in the pupa, and of the remainder some may remain five or more years before emerging. The object of this note is to point out that the emergence or not of any particular pupa in a particular March is determined the previous autumn. If a number of *nubeculosa* pupae are watched during October and November it will be noticed that some are turning darker in colour, and by December will be almost black, doubtless due to the formation of the perfect insect inside the shell. Now it will be found that all those darkened pupae, and only those, will emerge the following March, while those pupae that are still light red in December will go over another year. The query that arises is this, "Is there any special electrical or other condition of the atmosphere in the autumn which foretells or controls the weather conditions of the following spring?" Everyone is of course acquainted with the fact that bad weather conditions at the usual time of emergence will cause some of the pupae of many species to go over a year, but in these cases the perfect insect is only formed shortly before emergence, so the cause and effect are more understandable.—C. RIPPON, M.A., F.R.E.S.; Red Lodge, Cold Ash, Newbury, Berks.

OBITUARY.

F. J. HANBURY.

Frederick Janson Hanbury died at East Grinstead on March 1st, aged 86. Primarily a botanist, he was also a keen entomologist, and collected many rare and local Lepidoptera when visiting out-of-the-way places in search of plants. He was botanizing with S. Webb when *Nonagria sparganii* was added to the British list; he also collected with E. R. Bankes in S. Devon and captured and bred some of the scarcer migrants. Unfortunately he published very few of his observations. He was a vice-president of both the City of London Entomological Society, and North London Natural History Society, and became a Fellow of the Royal Entomological Society in 1891. We understand his collection of Lepidoptera will be sold at Stevens's.

H. M. E.



John Beale Sons & Co. New York, London

Yours sincerely
Edward Meyrick

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EDWARD MEYRICK, B.A., F.R.S.

(Plate II.)

EDWARD MEYRICK, son of the Rev. Edward Meyrick, was born at Ramsbury, Wilts. on November 24th, 1854. He was educated at Marlborough College and Trinity College, Cambridge, and was for thirty-seven years a schoolmaster. He went to Australia in December, 1877, taking up a post at Sydney Grammar School in 1878. During 1882-1883 he taught at Christchurch Cathedral Grammar School, New Zealand, but returned to Australia to teach at King's School, Paramatta, N.S.W., till the end of 1886, when he came back to this country and became an Assistant Master at his old school, a post which he held until his retirement in 1914.

Meyrick was interested in Lepidoptera long before he went to Australia, the richness of the microlepidopterous fauna of which continent made a great impression on him. It says much for the satisfying nature of systematic work, that a man of such unflagging energy could give up field work in such an entomological paradise for the quieter life of the student. His output was prodigious. He wrote many papers on the lepidopterous fauna of Australia, New Zealand, the South Pacific Islands, Burma and Malaya, India, South Africa and South America, besides his contributions to such works as Wytzman's *Genera Insectorum* and Junk's *Lepidopterorum Catalogus*. He made a notable contribution to the knowledge of the Lepidoptera of this country in *A Handbook of British Lepidoptera*, published in 1895, of which he issued a revised edition in 1928. In 1912 he commenced the publication of his own magazine, of which four complete volumes and part of volume five comprise some 2500 pages.

It has been stated, and this can surely be no exaggeration, that the number of species described by Meyrick exceeded 20,000—a truly imposing total if one takes into account the fact that much of his work was not of the purely descriptive kind, but embodied classificatory results of a highly important character.

Meyrick was President of the Marlborough College Natural History Society until 1914, and played a great part in encouraging the study of natural history in the school. The records of anthropometric measurement of Marlborough boys, for which Meyrick was for many years responsible, proved to be almost the only material available for comparative purposes and afforded information of the greatest value to the Inter-Departmental Committee on Physical Deterioration, which reported in 1904. He became a Fellow of the

Entomological Society of London in 1880, of the Zoological Society of London in 1889, and was elected a Fellow of the Royal Society in 1904. He was awarded the Captain Scott Memorial Medal of South Africa in 1927. From 1926 until his death Meyrick was President of the East Wiltshire Conservative Association.

Edward Meyrick was actively at work until a few days before his death on March 31st, 1938. He made a regular daily practice of working until an hour after midnight. His collection contained such a large proportion of the known Microlepidoptera of the world that he rarely needed to visit the British Museum (Natural History); the collection, of inestimable value, was bequeathed to that institution, where it is now safely housed. So from among us has passed, greatly regretted, though we saw him but rarely, a charming personality.

W. H. T. T.

LESTES DRYAS KIRBY (PARANEUROPTERA) IN ESSEX.—On July 1st, 1931, I visited a large old brickfield pond at Shenfield to look for dragonflies. There was very little about, though it was a sunny day, so I went into the adjoining meadows in search of other things. There I took two *Lestes* which were fluttering about over the long uncut grass. I did not see any others. Though the distance made it doubtful, it seemed that they must have bred in the brickfields pond. On examination at home they proved to be a male and female *Lestes dryas*, the male being teneral. On July 12th, 1932, I again visited the place, and found to my consternation that the big pond had been filled up with earth excavated in the course of widening the railway. However, I went to the meadow where I had found *L. dryas* the year before, and was very pleased to find them in fair numbers flitting about over the long grass. I took several of each sex; two of the males were teneral. Clearly the big pond was not the breeding-place. Investigation showed that the meadow lay between two small ponds—one very dark and inaccessible in the middle of a dense thicket, the other just within the edge of a wood, shallow and, though shady, receiving a fair amount of sunshine through the trees. It seemed to me that this latter pond must be the breeding-place, but although I watched it for an hour or more, I saw no sign of *L. dryas*. Perhaps oviposition had not yet begun, or it may take place at some other hour of the day. I was there only between 10 a.m. and 1.30 p.m. One thing and another prevented me from visiting the place until July 14th, 1937—a very hot, sunny day. Not a sign of *L. dryas* anywhere, unless a small dragonfly caught sight of for a moment in among the long grass and lost again was one. Again I watched the pond for a long time in vain. The spot is quite unchanged, and there seems no reason why the species should have vanished. The weather in June and the beginning of July had been very unusual, and this may have affected emergence. I hope to look them up again this year.—W. R. FRAZER; 6, College Gardens, Dulwich, S.E. 21.

OBSERVATIONS ON THE GENERIC NOMENCLATURE OF
SOME BRITISH AGROTIDAE.

By W. H. T. TAMS.

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THE type of the genus *Hydrilla* Boisduval, 1840, is *H. caliginosa* Treitschke, cited in Orbigny, 1845, *Dictionnaire Universelle Hist. Nat.*, 6: 743, and *Hydrilla* is thus a synonym of *Acosmetia* Stephens, 1829.

I propose, therefore, the name **Hydrillula**, nom. nov., for the genus "*Hydrilla*" as described and restricted by Guenée (1852, *Spec. Gen. Lep.*, 5: 236), with type *Noctua pallustris* Hübner, 1803 1808, which becomes *Hydrillula palustris* Hübner. Under the rules of the International Code of Zoological Nomenclature it is permissible to correct Hübner's spelling and so avoid perpetuating the name "*pallustris*".

The generic name *Caradrina* has recently become wrongly associated with certain species of the Agrotid subfamily *Agrotinae*. Dr. J. H. McDunnough (Bulletin No. 55, Canada Department of Mines, 1929) uses the name *Caradrina* for *C. margaritacea* Vill., on the strength of Duponchel's citation in 1829 of *Noctua i-indactum* Hübner, 1800 1803, which is a synonym of *margaritacea* Vill., 1789. There is, however, a citation earlier than that of Duponchel, for in 1819 Samouelle cited *Noctua morpheus* as type, and this is fortunate, in that it preserves *Caradrina* Oehsenheimer, 1816, in its previously universally accepted sense.

The restoration of *Caradrina* in its rightful application leaves the genus characterized by McDunnough without a name. Fortunately the genus *Rhyacia* Hübner, 1821, with type *R. lucipeta* Schiffermüller, cited by Hampson in 1903, is available, and will include the two species *Rhyacia simulans* Hufnagel and *Rhyacia quadrangula* Zetterstedt. For the present *Rhyacia margaritacea* Vill. may be included in this genus, in spite of the fact that it is, in general appearance, a very different insect.

The type of the genus *Graphiphora* Oehsenheimer, 1816, is *Noctua augur* Fabricius, 1775, cited by Samouelle, 1819, and therefore *Graphiphora* will replace McDunnough's name *Pseudospaelotis*, 1929, the type of that genus, *haruspica* Grote, being congeneric with *G. augur* Fabricius. For the genus to which McDunnough applied the name *Graphiphora* the name *Amathes* Hübner, 1821, type *Amathes baja* Schiffermüller, cited by Butler, 1889, is available.

A FURTHER LIST OF HYBRID BISTONINAE.

BY J. W. HESLOP HARRISON, D.Sc., F.R.S.

EVERY season since my last* lists of hybrid Bistoninae appeared the work has proceeded with greater or less intensity, with the result that a very large number of new hybrids has been reared. Although the necessary genetical and cytological examination has not been completed, in view of the numerous requests I have received recently, it is proposed to present a brief account of the crosses in the form of two papers, one dealing with the primary hybrids, back crosses and the simpler hybrids involving three species, and the second with a series of crosses of varying degrees of complexity.

I should note that, in spite of the fact that the naming of hybrids, other than those of a primary order, appeals but little to me, in response to demands from several continental investigators, names are supplied, as far as the present paper is concerned, to each form. These new names are in heavy type.

I. PRIMARY HYBRIDS.

- (1) *Lycia hirtaria* ♂ × *Nyssia alpina* ♀ = **hyb. recognita.**

This hybrid, as was to be expected from the relationship between *N. zonaria*, *N. graecaria* and *N. alpina*, and from the similarity of their chromosome complements (51), produces males only.

- (2) *N. alpina* ♂ × *L. hirtaria* ♀ = **hyb. incerta.**

Only four males were bred, so that it is too early to state dogmatically that this cross exhibits no females.

- (3) *Poecilopsis isabellae* ♂ × *L. hirtaria* ♀ = **hyb. soffneri.**

Males and females were obtained, but the sex ratio depends greatly on the *hirtaria* race introduced, the number of females approaching 50% when English *hirtaria* are employed, and falling to a low level when the yellowish var. *scotica* or continental strains are used. Named after Herr J. Soffner, Trautenau, Czecho-Slovakia, who has generously assisted me with supplies of *Poecilopsis isabellae* ova.

- (4) *Poecilopsis lapponaria* ♂ × *L. hirtaria* ♀ = **hyb. leesi.**

Both sexes occur, but the females show less development in the wings than in the reciprocal cross. Named after Mr. F. Lees, who has done good work with these crosses.

- (5) *P. lapponaria* ♂ × *P. pomonaria* ♀ = **hyb. scotica.**

This mating yields the sexes in equal numbers, but, unlike what holds in the reverse cross, the females, as well as the males, are fertile. In consequence an F² generation has been secured.

* For lists of other hybrids in this group see *Entomologist*, 43 : 197, and 49 : 76.

(6) *Poecilopsis isabellae* ♂ × *P. lapponaria* ♀ = hyb. **omissa**.

This hybrid, formerly considered by me as unobtainable, has been reared on many occasions in recent years. The sex ratio is normal, but the females are sterile.

(7) *P. lapponaria* ♂ × *P. isabellae* ♀ = **mirabilis**.

The results of this cross are practically indistinguishable from those of the preceding save that the females are fertile.

(8) *P. lapponaria* ♂ × *N. alpina* ♀ = hyb. **tarda**.

Only odd males bred.

(9) *N. alpina* ♂ × *P. lapponaria* ♀ = hyb. **difficilis**.

One crippled male reared.

(10) *N. zonaria* ♂ × *P. isabellae* ♀ = hyb. **johnsoni**.

Males and females occur in approximately equal numbers, but both sexes are sterile.

II. BACK CROSSES.

(11) (*L. hirtaria* ♂ × *P. isabellae* ♀) ♂ × *L. hirtaria* ♀ = hyb. **grandis**.

Yields males and intersexes.

(12) (*P. isabellae* ♂ × *L. hirtaria* ♀) ♂ × *L. hirtaria* ♀ = hyb. **dubra**.

Results as in (11).

(13) (*L. hirtaria* ♂ × *P. lapponaria* ♀) ♂ × *L. hirtaria* ♀ = hyb. **zetes**.

As in the preceding cross.

(14) (*P. lapponaria* ♂ × *L. hirtaria* ♀) ♂ × *L. hirtaria* ♀ = **maera**.

Also gives males and intersexes.

(15) (*P. pomonaria* ♂ × *P. lapponaria* ♀) ♂ × *P. pomonaria* ♀ = hyb. **similis**.

Both sexes reared and fertile.

(16) (*P. pomonaria* ♂ × *P. lapponaria* ♀) ♂ × *P. lapponaria* ♀ = hyb. **salicis**.

Sexes in approximately equal numbers, but females sterile.

(17) (*P. lapponaria* ♂ × *P. pomonaria* ♀) ♂ × *P. lapponaria* ♀ = hyb. **ancilla**.

Both sexes bred, fertility not known.

(18) (*P. lapponaria* ♂ × *P. pomonaria* ♀) ♂ × *P. pomonaria* ♀ = hyb. **hector**.

Sexes in equal numbers with females fertile.

(19) *P. pomonaria* ♂ × (*P. lapponaria* × *P. pomonaria* ♀) ♀ = hyb. **baton**.

Both sexes secured.

(20) *P. lapponaria* ♂ × (*P. lapponaria* ♂ × *P. pomonaria* ♀) ♀ = hyb. **argentina**.

Both sexes secured and proved fertile.

(21) (*P. isabellae* ♂ × *P. lapponaria* ♀) ♀ × *P. lapponaria* ♀ = hyb. **metis**.

Males fertile, females sterile.

(22) (*P. isabellae* ♂ × *P. lapponaria* ♀) ♂ × *P. isabellae* ♀ = hyb. **tethys**.

Fertile in both sexes.

(23) (*P. lapponaria* ♂ × *P. isabellae* ♀) ♂ × *P. lapponaria* ♀ = hyb. **cuprea**.

Only a few males reared.

(24) (*P. lapponaria* ♂ × *P. isabellae* ♀) ♂ × *P. isabellae* ♀ = hyb. **nicholsoni**.

Both sexes bred and found to be fertile.

(25) *P. isabellae* ♂ × (*P. lapponaria* ♂ × *P. isabellae* ♀) ♀ = hyb. **buto**.

Both sexes reared and males found fertile.

(26) *P. lapponaria* ♂ × (*P. lapponaria* ♂ × *P. isabellae* ♀) ♀ = hyb. **boreas**.

This cross proved fertile in both sexes.

(27) (*P. isabellae* ♂ × *P. pomonaria* ♀) ♂ × *P. isabellae* ♀ = hyb. **rufilineata**.

Both sexes fertile.

(28) (*P. isabellae* ♂ × *P. pomonaria* ♀) ♂ × *P. pomonaria* ♀ = hyb. **rufescens**.

As with the preceding cross.

(29) *P. isabellae* ♂ × (*P. isabellae* ♂ × *P. pomonaria* ♀) ♀ = hyb. **herse**.

Also fertile in both sexes.

(30) *P. pomonaria* ♂ × (*P. isabellae* ♂ × *P. pomonaria* ♀) ♀ = hyb. **aliena**.

Circumstances as in the reciprocal cross.

(31) *P. pomonaria* ♂ × (*P. pomonaria* ♂ × *P. isabella* ♀) ♀ = hyb. **nitens**.

Both sexes fully fertile.

(32) (*P. pomonaria* ♂ × *P. isabellae* ♀) ♂ × *P. pomonaria* ♀ = hyb. **fusca**.

As in the reverse cross.

(33) (*N. zonaria* ♂ × *Nyssia graecaria* ♀) ♂ × *N. graecaria* ♀ = hyb. **bretschneideri**.

This hybrid was reared by Herr Bretschneider, of Dresden, Saxony, who has been extremely successful in rearing hybrids in which *N. graecaria* is concerned. He very kindly sent me ova of this, and other crosses, and I am very pleased to attach his name to it. I intend to publish a full account of *N. hyb. bretschneideri* and allied forms in one of the German entomological periodicals.

III. SIMPLE TRISPECIFIC CROSSES.

(34) *L. hirtaria* ♂ × (*P. isabellae* ♂ × *P. pomonaria* ♀) ♀ = hyb. **terna**.

(35) (*P. isabellae* ♂ × *P. pomonaria* ♀) ♂ × *L. hirtaria* ♀ = hyb. **miniata**.

Here we have a pair of reciprocal hybrids with the sex ratios as in cross (3). Both display a much greater variation swing than in that hybrid.

(36) *L. hirtaria* ♂ × (*P. isabellae* ♂ × *P. pomonaria* ♀) ♀ = hyb. **haasi**.

(37) (*P. isabellae* ♂ × *P. pomonaria* ♀) ♂ × *L. hirtaria* ♀ = hyb. **vedrae**.

The conditions in respect to sex ratio and variability parallel those of (34) and (35). No. 36 is called after Herr Haas, in recognition of help given.

(38) (*P. lapponaria* ♂ × *P. pomonaria* ♀) ♂ × *L. hirtaria* ♀ = hyb. **propinqua**.

Both sexes, except for a greater swing of variation, tend to resemble those of cross (4).

(39) (*P. pomonaria* ♂ × *P. lapponaria* ♀) ♂ × *L. hirtaria* ♀ = hyb. **cretschmari**.

Only one male and one female bred.

(40) (*P. isabellae* ♂ × *P. pomonaria* ♀) ♂ × *N. zonaria* ♀ = hyb. **marmorata**.

Only sterile males reared.

(41) (*P. isabellae* ♂ × *P. pomonaria* ♀) ♂ × *P. lapponaria* ♀ = hyb. **dispar**.

Both sexes reared: both sterile.

(42) (*P. pomonaria* ♂ × *P. isabellae* ♀) ♂ × *P. lapponaria* ♀ = hyb. **gracilis**.

Resembles cross (41) in all respects.

(43) (*P. lapponaria* ♂ × *P. pomonaria* ♀) ♂ × *N. zonaria* ♀ = hyb. **tesselata**.

Again a hybrid which yields sterile males only.

(44) (*P. isabellae* ♂ × *P. lapponaria* ♀) ♂ × *N. zonaria* ♀ = hyb. **medea**.

Sterile males only, as in the preceding.

(45) (*P. isabellae* ♂ × *P. lapponaria* ♀) ♂ × *P. pomonaria* ♀ = hyb. **crataegi**.

Both sexes reared and, when tested, fertile.

(46) (*P. lapponaria* ♂ × *P. pomonaria* ♀) ♂ × *P. isabellae* ♀ = hyb. **affinis**.

Both sexes fertile.

(47) *P. isabellae* ♂ × (*P. lapponaria* × *P. pomonaria* ♀) ♀ =
hyb. **rufifrons**.

Males alone, as far as investigations have gone, seem fertile.

(48) (*P. pomonaria* ♂ × *P. lapponaria* ♀) ♂ × *P. isabellae* ♀
= hyb. **varia**.

Males fully, females slightly fertile.

(49) *P. pomonaria* ♂ × (*P. lapponaria* ♂ × *P. isabellae* ♀) ♀
= hyb. **errans**.

Both sexes reared and males found fertile.

(50) (*P. lapponaria* ♂ × *P. isabellae* ♀) ♂ × *P. pomonaria* ♀ =
hyb. **contigua**.

Fertile in both sexes.

(51) *P. lapponaria* ♂ × (*P. isabellae* ♂ × *P. pomonaria* ♀) ♀
= hyb. **semicaledonica**.

Precisely the same as in the previous cross.

(52) *P. lapponaria* ♂ × (*P. pomonaria* ♂ × *P. isabellae* ♀) ♀ =
hyb. **montana**.

Males quite fertile; females less so, apparently as in cross (48),
owing to some defect in the egg-shell.

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Newcastle-upon-Tyne.

FISH ATTACKED BY DRAGONFLY LARVA. —The keeper of Ewell Court Park informs me that a few days ago he noticed in the park lake a roach behaving in an unusual manner, and on securing it found a large dragonfly larva adhering to one of the fish's gills. The fish was about six inches in length. A. A. W. BUCKSTONE; 90, Pams Way, Ewell, Surrey.

PYRALIS GLAUCINALIS IN LEICESTERSHIRE. —I see Mr. H. A. Buckler has one or two Leicestershire records in the *Entomologist* for April, so the following record might interest him and other Leicestershire readers. Meyrick says *glaucinalis* is "rather local". I took it at Bottesford in Leicestershire on July 12th, 1909. I have also taken it, one specimen drowned in a water-tub, here at Upton in Notts on August 29th, 1923. J. H. Leech, in his beautiful little work on the British Pyralides, says (p. 12) that the larva feeds on "old thatch and the pith of old raspberry canes". So perhaps that accounts for it, because I had raspberries, both at Bottesford and here at Upton, although I found it at Bottesford amongst horse-radish leaves; perhaps it may feed in the dead leaf-stalks of the horse-radish? I see it is recorded in H. C. Hayward's *Lepidoptera of Derbyshire*: Breadsall 1854, Derby once, Trent Valley. —A. S. B. F. P. WYNNE; Upton House, Upton, nr. Newark, Notts.

THE LIFE STORY OF *APATURA IRIS*.

BY STANLEY MORRIS.

(Continued from p 113)

After the moult the cast skin is sometimes eaten, but more often left on the leaf. The larva generally rests for eighteen hours before commencing to feed again. At this stage it is from 16 to 17 mm. in length, inclusive of the horns, which are about 3.5 mm. In coloration it varies little from the previous stage, except that the yellowish lateral markings have now given place to well-defined whitish stripes, and the wart-like protuberances on the dorsal surface have disappeared. There is also an obscure whitish stripe extending backwards from the base of each horn as far as the third segment.

The resting attitude of the larva now becomes more pronounced. The head and forepart of the body as far as the prolegs are raised clear of the leaf and held with the dorsal surface much arched, the horns directed downwards in symmetrical continuation of this curve, so that, from their tip to the anal segment, the contour is nearly a perfect semicircle. In this attitude it will remain motionless for hours together, except that, should any disturbance occur, it will smartly swing round to left or right, as it were on a pivot, to strike away the cause of the disturbance.

Intermediate moult. I have previously mentioned (p. 112) that larvae will occasionally winter in the fourth coat—that is, after the third moult. These larvae will sometimes moult again about the same time that others, which hibernated normally, are moulting for the third time. If anything, they are somewhat earlier in attaining the fifth coat than the majority of larvae are in obtaining the fourth.

The earliest date that I can find for this intermediate moult is May 2nd. This larva commenced to feed again within a day, and I had anticipations of being able to make an early record for pupation. Ten days later, however, that is, on May 12th, it set again for moulting, although it had already passed the normal number of moults and should have fed on for pupation. On May 22nd, having then been "set" for ten days, it successfully came through a fifth moult. The larva now measured 29.5 mm. in length, inclusive of horns, whereas the average measurement of a larva after the fourth moult is about 25.5 mm. This additional moult is again not a recognized one, and like those larvae in the third coat, which moult again almost as soon as they come out of hibernation, it would appear that the last moult on May 22nd was the normal fourth, and that the moult on May 2nd was an intermediate one

between the normal third and fourth moults. It is difficult to account for these intermediate moults ; I can only suggest that they are a matter of convenience or may be of necessity.

It will be of interest here to complete the life-history of this larva. After the last moult on May 22nd it fed up normally until June 12th, when it set for pupation. It pupated on June 16th and produced a male imago on July 1st.

Fourth moult.—The average periods between the third and fourth moults is from fifteen to eighteen days, during which period the larva increases in size by some 5 to 7 mm.

The period occupied in the moult is again very variable. On an average seven days appears to be about normal, but I have known larvae as short as three, and as long as ten days, in passing this stage. The earliest date that I have recorded for this moult is May 12th, 1933, and the latest May 29th, 1928. The cast skin is not now eaten.

In appearance the larva is in every respect similar to the last stage, except that the horns are paler in colour and the whitish stripes, extending from their base along either side of the head, are now more pronounced. The knobs of the horns are rust-coloured and slightly more prominent.

After the last moult the larva feeds up quickly and increases in size proportionately—more especially during the first week after the moult. On an average the rate of growth is not less than $2\frac{1}{2}$ mm. every two days, so that by the time it is fully grown it has doubled its size and measures from 46 to 50 mm. in length inclusive of horns.

Pupation.—The earliest date that I have known for pupation is June 2nd, 1933. During this year many larvae were fully grown before May 25th, but went through a process of "fining" before setting for pupation. This "marking time" was doubtless done to delay the time of emergence : had pupation taken place normally imagines would have been on the wing, in that year, as early as the first week of June. The latest date for pupation that I have recorded is July 16th, 1932 an exceptional date.

For pupation the larva moves somewhat more in to the centre of the tree, and usually slightly higher up than the branch upon which it has fed. Here it retires to the underside of the leaf, having first secured this to the branch by liberally spinning over the stem with silk.

The position taken up is lengthwise with the leaf, and the larva "sets" with its head to the stem. In this position it spins a silken pad on the under-surface of the leaf, to which, later, the pupa will be attached. After the second day the larva reverses its position : the head now points towards the tip of the leaf, to which it is attached only by the anal claspers and the middle pair of prolegs ;

the remaining prolegs are contracted beneath the body, and the fore part of the body held quite clear of the leaf.

The colour of the larva gradually becomes very much paler, and later assumes almost a crystalline form. There is also a marked shrinkage of tissue - a "fining", as it were, before the final stage is effected.

At the psychological moment the larva releases its prolegs, which have held it in suspense, and swings out clear of the leaf, to which it is now attached only by the anal claspers. By a repeated arching and contracting of the thoracic segments, and an alternative process of expansion and contraction of the hinder segments, a dehiscence is effected towards the middle, and the skin on the after parts is gradually thrust back around the cremaster. This process completed, the segments immediately behind the head commence to swell rapidly. Shortly, the cutting edge of the pupal envelope gradually appears through the skin, severing this down the centre of the back. After a short period the horns become widely distended and the beak of the pupa is thrust through the skin immediately between them. From this stage the fore portions of the larval skin, including the horns and head covering, are gradually forced back beneath the body towards the tail, the cutting edge of the pupa continuing to develop in the process of severing the skin down the centre of the back.

In less than two minutes the horns and surrounding skin have been pressed back beneath the body and now encircle the cremaster, when, by a quick movement, the larva withdraws the anal segment clear of the cast skin and attaches the strig of the pupa to the silk pad spun on the leaf, by means of the minute hooks with which the cremaster is furnished. A vigorous gyrating movement of the cremaster ensures that this portion of the pupa is firmly attached to the leaf.

Continuing this rotary movement, the cast skin, including the horns, is gradually worked down beneath the pupa and the leaf until it is finally discarded and falls to the ground.

At this stage the pupa is quite shapeless and little more than a thinly-clad edition of the former larva. Gradually, however, the envelope hardens, and the several parts of the pupa assume their normal proportions by a wonderful process of development. The complete change from larva to pupa occupies less than forty minutes, but it is a day or two before the various parts of the insect are fully outlined within the pupal envelope and thus has hardened sufficiently to protect them during the process of after-development.

In 1934, and again in 1935, many larvae pupated within three days. The reason for this departure from the ordinary routine is not clear. In 1934 June was a fine, dry month, with considerable

sunshine; but in 1935 very different conditions obtained, and for the most part the month was wet and cold, so that climatic conditions can have had no bearing upon the point.

PUPA.

The pupa is of a pale, whitish-green colour, exactly in keeping with the colour of the down on the under-surface of the willow-leaf. The average measurement is from 28 to 30 mm. in length, and about 13 mm. measured transversely through its widest points. The pupa of the female insect is from 3 to 5 mm. longer and proportionately wider.

In outline the pupa is roughly triangular, with the apex, formed by the dorsal surface, bluntly obtuse and the base, outlining the ventral surface, nearly straight from the beak to the cremaster. The head is furnished with two sharp beak-like points and the dorsal surface is somewhat sharply keeled.

If touched the pupa has a habit of wriggling violently, so much so that if one is unprepared for it the effort is sudden enough to be almost startling.

The pupal stage may vary from thirteen to twenty days—a fair average time is from fourteen to sixteen days. Male imagines, for the most part, emerge prior to the females, and, as a rule, during the morning, while females favour night-time or very early morning. This rule does not always obtain, but it is sufficiently marked to be of general application.

The earliest date that I have recorded for emergence is June 16th, 1933, and the latest August 12th, 1934; the latter is an exceptional date. In an average year the majority of insects emerge during the last week of June and the first ten days of July.

On emergence the female insect is much more timid than the male. On this account it is necessary to exercise care when examining the cages, since at the slightest disturbance they are prone to fall to the bottom, where they flutter about and sadly damage themselves. The bottom of the cage should, on this account, always be covered with cotton-wool as a precaution.

THE IMAGO.

As compared with its known frequency, *ms* is not so commonly seen on the wing as its numbers warrant, unless one happens to locate the trysting-place of the males. Being naturally a high flyer, one fails to notice it as it sails gracefully aloft on a line with the tree-tops, floating, with motionless wings, swiftly and silently, above one's ordinary line of vision.

(To be continued)

THE INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE.*

BY B. C. S. WARREN.

SOME readers may have followed the articles on nomenclature in the February, March and April numbers of the *Entomologist's Record* by myself, the Rev. G. Wheeler, Mr. Fletcher, Dr. Williams, Mr. Wightman and Brig.-Gen. Cooke, as well as earlier ones by Mr. Wheeler and Gen. Cooke. The misleading impression as to the value of the International Code given by the earlier articles led me to try and present the question from the point of view of the systematic worker. My article was extensively criticized and further attacks made on the Code. As for the greater part these attacks appeared, on examination, to rest on no very solid basis. I felt they should not be passed in silence, but the Editors of the *Entomologist's Record* did not see their way to publishing my comments. I will consider the various articles in the order in which they were published.

Mr. Wheeler started by assuming two points, or rules, in the second of which he lays down that "the use of two or more names for the same object is a matter of complete indifference so long as neither name has been applied to any object but the one in question". This he claimed would not create confusion. But where would such a rule lead? "Two or more"; how many more? Is there a limit, and who or what is to fix it? Some species have been given as many as sixteen names (perhaps more). If three men may select the names they like, why may not the other thirteen do likewise? To this Mr. Wheeler adds that in such cases the oldest name would be the correct one. So one is advised that, knowing the correct name, it is "a matter of complete indifference" if one uses the incorrect one, or several incorrect ones. Such inconsistency does not cause confusion; for some unknown reason that apparently only results on the consistent use of the correct name. Mr. Wheeler takes a mild pleasure in using the incorrect name, and condemns me for using the correct one in two given cases, assuring us that he has only been prevented from using the incorrect name for both by the chance that he could not identify the species represented by the photo I sent him. But this is not all; so keenly does he pursue the incorrect name that he uses *arete* for *Erebia claudina* (not "*clauda*") even though in doing so he is acting in direct opposition to the rule he laid down on the previous page,

* This article was, I understand, intended to wind up the discussion in the *Entomologist's Record* which Mr. Warren initiated. It is apparently unacceptable to the Editors of that journal. I am very pleased to have the opportunity of publishing it.—N. D. R.

i. e. that a name must not have been applied to any object but the one in question. The name *arete* is that which applies (correctly) to the remarkable form of *Aphantopus hyperantus*, which is without the dark spots and golden rings.

But Mr. Wheeler's desire for alternatives does not even stop at the actual names, it also applies to their spelling. He would spell a name, when possible, in any manner rather than that used by the author of the name; and as he himself states this spelling to be a matter of "most profound indifference", what is the use of making these *unnecessary* changes? All this supports in the most emphatic manner the truth of what I wrote before, that changes of names are, in themselves, but a small matter, and that no writer or collector has the least objection to such changes when the *reason* for making them is in accordance with his *own* views.

Again, in order to avoid confusion Mr. Wheeler stresses one rule as essential, *i. e.* that a name in general use for one insect cannot be transferred to another. That sounds very well, but in fact it is merely another plea for the use of the incorrect name. Mr. Wheeler tells us it is inexcusable to apply the name *orbitulus* to the insect which has been known as *pheretes*. But, when a writer has described one insect under a given name, what justification can there be for attaching *that* name to a different insect? Obviously, none whatsoever. The fact that ignorance has done so in the past will not change the facts, alter the description, or make it any more accurate now. If the mistakes of past entomologists are to be binding on us for ever, what is the use of the study of entomology? Such a suggestion, of course, is merely making fact subservient to personal prejudices. Mr. Wheeler also fails to notice that the direct result of his "essential rule" is exactly in opposition to his second rule, that a name cannot be used if it has been applied to any other species than the one in question. I may also point out that it is changes such as this to which Gen. Cooke refers as being of "no scientific value".

In the past I have made a practice of making the necessary changes in the labels of my collection as soon as it is established that any name in use is not the correct one. I can say from experience that in a month or two, if one follows this plan, it becomes just as natural to use one name as another. Collectors will also find it a source of satisfaction to know that the names their specimens bear are their *real* names, and not merely assumed ones.

Mr. Wheeler finds it difficult to give any practical or convincing reasons to support his view that the International Code should be ignored by entomologists. He says it would have been repudiated by the 1915 International Congress of Entomology if that Congress had not been prevented from meeting. If that is so I can only

regard it as providential that that Congress was prevented from meeting. This, however, is quite beside the mark. What really matters is that the subsequent meetings of the International Congress of Entomology not only accepted the authority of the International Commission and the Code, but also acted on the latter, with most satisfactory results. This makes it all the more difficult to understand what supposed value there can be in an effort to ignore the Code, now that it has been accepted by the representative entomologists of so many countries. The attitude taken up by the Editors of the *Entomologist's Record* can, therefore, only be deplored, serving, as it does, but to encourage those who, regardless of the consequences, employ any names they like and consider it sufficient reason to say they do not agree with the Code. In this manner the existing jumble of names is perpetuated, and emphasis laid on the lack of scientific method, which has gained an unmerited contempt for systematic entomological work among workers in other branches of zoology.

To Mr. Bainbrigg Fletcher's article I need only make very brief reference. I must admit to being agreeably surprised to find so much agreement between his views and my own. There are, however, two points I must mention :

First : the authority of the International Code. Mr. Fletcher tells us that as an entomologist he refuses "to accept rules made by zoologists". This statement is quite inconsistent with the rest of what he writes, for he relies largely on the rules of the Code.

The second point is Mr. Fletcher's reference to the value of the vote at the plenary sessions of the International Congress of Entomology. He tells us that only thirty out of three hundred members attended the meetings of the section on nomenclature in Paris in 1932, and because of this states the vote of the majority of the members at the plenary session is valueless. That statement cannot be accepted for a moment. It is difficult to understand how Mr. Fletcher can suppose he can disregard the votes of hundreds of entomologists on such a pretext. The majority of entomologists may not be interested in problems of nomenclature, but it seems that many now realize the necessity for a stable code of rules, and the desirability that experts should deal with such problems as may arise. They may, therefore, not consider it necessary to attend the sectional meetings on nomenclature themselves, but have no hesitation in supporting the resolutions put forward from such meetings at the plenary sessions. The votes of the majority of the members of the Congress can, therefore, by no means be set aside as valueless. Such votes have shown, quite unmistakably, that large numbers of entomologists of many countries have realized that the Code is essential ; also that they intend to support it. If

this was not the case they would, of course, have voted against it. Many sectional meetings must always overlap at a Congress, and members will attend those which interest them most. Their inability to attend all sectional meetings is no reason to bar them from voting at the plenary sessions, nor for assuming they have not sufficient intelligence to know what they are voting for.

Dr. Williams's article calls for slightly more comment. He begins by telling us he regards nomenclature as "a subject of the most trivial importance, names being given to insects for the same reason that they are given to towns and rivers, or such objects as spades". On the strength of this he would abolish the law of priority and the Code. But, consider a moment. If spades of new types were being added to trade at the rate at which new races of insects are being described, how long would the name "spade" suffice? To Dr. Williams they would all be "spades", and it would be of no importance what their use or how the various types differed. But neither trade nor science work on such slipshod lines, and every type would get its trade name, and the law of priority would be most rigidly enforced. If Dr. Williams doubts this let him try and put some new object on the market under an existing name; he will soon find out what the law of priority in "ordinary use" means.

From this it is evident that Dr. Williams's attitude to nomenclature has been to ignore it: his subsequent remarks, therefore, cannot claim to be based on any real study of the subject. His remarks on "extracted" genera seem illogical. He writes: ". . . even when an author has extracted from an original mixed assembly a homogeneous group. . . ." and "the practice of destroying such an extracted genus by the deliberate selection of one of its species as the genotype of the original mixed assembly appears to me to involve the treatment of the work of our illustrious predecessors with a reckless contempt. . . ." This lofty utterance may impress those who are without any knowledge of the actual facts. The whole remark relates, transparently, to one well-known case, and the demand for recognition of "extracted" genera is merely designed to meet that case, without any consideration of what its wider application would mean. The "extraction" in question was made in the early nineteenth century, and the resulting group could not be expected to satisfy the needs of present-day classification; it would require much further division into accurately-defined genera. When a worker came to do this there would be no means by which he could tell to which of the many genera before him the original name applied. If two workers were engaged, independently, the chances would favour the name being attached to two different genera. It would probably end in

being discarded altogether. This process is what Dr. Williams upholds as scientific, and condemns as childish the simple method of the Code, whereby a generic name is fixed to a type species once for all, making further mistake impossible. And what about the treatment of the work of our "illustrious predecessors" for which Dr. Williams is so concerned? In the actual case he was thinking of, if Dr. Williams had his way, the accurate work (worthy of the term scientific) of Curtis, Swainson, Westwood, Scudder and Kirby (not to mention living writers) would all be swept away in "reckless contempt" to save the illustrious (?) Oken's classification, which could only be called the most elementary form of "lumping". Yet a few lines further on Dr. Williams is very contemptuous of "amateurish lumping".

Then, the genus *Brenthis*. Dr. Williams tells us that it was "long ago differentiated on structural grounds". Is this really so? From such works as I have at hand there seems much uncertainty as to the definition of the genus. Seitz remarks that it is not strictly possible to separate the smaller species as *Brenthis*. Kirby and Gaede both rely on the location of the 10th nervure of the fore wing, springing from the discoidal cell in *Argynnis* and from nervure 7 in *Brenthis*. According to this they place *hecate*, the genotype of *Brenthis*, in *Argynnis*! *Ino* and *daphne* also in *Argynnis*. Yet my specimens of *ino* show that by the selection of a series one could place it in either. *Daphne* is also variable, though less so. Further, in all the large *Argynnis* specimens showing the "*Brenthis*" location of nervure 10 can be found. Doubtless other structural characters exist which are known to Dr. Williams, but at the moment I cannot consult the necessary works to establish what they may be. But in view of the differing conceptions of the genus, one cannot but wonder if they are of scientific accuracy. On the basis of neurulation it is obviously impossible to differentiate these genera.

The fact that the rules occasionally invalidate a useful name would seem a poor reason for abandoning them: but this drawback is provided for, and so in the case of the genus *Satyrus* (about which Dr. Williams complains) the International Commission has fixed the genotype as *actaea* Esp. which one would have thought would have satisfied him. Why, then, waste time inveighing against the accuracy with which it was shown that this action by the Commission was necessary?

We now come to Mr. Wightman's article. He, alone, realizes the basic fact of the wide range of problems nomenclature has to deal with, and that the International Code can alone claim the necessary authority to deal with such questions. On one point only must I comment. It is not clear what he means by the

"admissibility" of changes. So long as a worker follows the rules exactly where is the question of "admissibility"? Mistakes, of course, will occur, but so far as one can judge, considering the confusion which existed, the number of mistakes has been surprisingly small.

Finally, we come to Brig.-Gen. Cooke's third contribution to the subject. Unfortunately the matter is far from being as simple as he seems to think. He tells us that "practical entomologists . . . want to be certain of the identity of an insect when they see it mentioned in print". Those who follow the Code realized that very many years ago. His reference to changes not being of scientific value I have dealt with already, but when he says budding collectors are discouraged by such changes it appears to me to be a gross libel on beginners. I have always found them willing to learn, and having no prejudices in favour of any one name, they have no objection to a change or two. About the certainty of identity of an insect by name, a little explanation is necessary. It is during the past thirty years only that entomologists have realized the necessity of accurate definition of subspecies; without this, further advance in insect taxonomy or in the study of evolution in insects will become more or less impossible. The correct use of subspecific names necessitates the accurate use of specific names; for the latter, of course, have a racial as well as specific value. This obvious fact is usually ignored by those who would simplify nomenclature. To take but one example (there are dozens). It is still a common habit for English collectors to write of "*L. aegon*", meaning *P. argus* ssp. *argus* or any one of a possible dozen other subspecies, according to the district they are writing of. I have noted that Gen. Cooke does so from districts so widely separated as the Pyrenees, Basses Alpes and S. Tyrol.

Tutt, in his *British Butterflies*, known and used by every English collector, showed, no less than *twenty-nine years ago*, that *aegon* was an Austrian subspecies of the species represented in England by the typical subspecies *argus* and one or two other subspecies. The exponents of "simple" and "common-sense" nomenclature continue to use the term "*aegon*" because they have done so for twenty years, though the majority of European entomologists have not done so. It is quite simple, but unfortunately, also quite useless. All they accomplish is to record the occurrence in England (or elsewhere) of an insect which is known not to exist there. This is their method of making the identity of an insect certain in print. One would have thought that all English collectors would have taken the trouble to study Tutt's work, but those who oppose the Code to-day have perforce to ignore the literature of the last quarter of a century. Great numbers of subspecies have been

recognized, but far more exist and will have to be dealt with. The exact expression of this immense scientific work is dependent on nomenclature, and when one thinks of the thousands of insects (not only *Lepidoptera*) can anyone really expect nomenclature to be a simple matter, to be debated without serious study?

Gen. Cooke suggests the following "broad principles" to guide nomenclature: "(1) Clear our minds of all obsessions regarding antique records where they involve unnecessary changes, and realize that the one and only object of giving names is to enable insects to be easily identified. (2) Retain, as far as possible, all specific names that have become generally known to living entomologists during the last twenty or thirty years. (3) Absolutely bar the transfer of a well-known name from one species to another."

Of these suggestions, (1) and (2) have been dealt with above, but when in (2) the suggestion is put forward as new, that all specific names are to be retained "as far as possible", what is one to think? How many articles are there not in the Code, concerned directly or indirectly, with the protection of the specific name? Apparently it has never occurred to Gen. Cooke to read the rules he criticizes so vehemently.

It is incredible how those who object to the rules (*i. e.* rules as distinct from their origin) appear under the delusion that a few vague generalities is all that is required to meet the needs of nomenclature. On reviewing the objections to the rules that were raised in the articles we have been considering, what strikes one most is how completely the writers seem to fail to grasp the magnitude and importance of the scientific work served by the Code, and the necessity for the application of names in an accurate manner consistent with fact.

The third of Gen. Cooke's principles, his only definite proposal, has already been shown (in my comments on a similar suggestion by Mr. Wheeler) to be quite inconsistent with scientific method.

Nomenclature requires adequate rules supported by International authority, and the International Code of Zoological Nomenclature meets these requirements in a very practical manner. *Experto crede.*

3, Augusta Mansions,
Folkestone.

NOTES AND OBSERVATIONS.

EARLY LEPIDOPTERA IN 1938.—The following are, to me, mostly record early dates: *Saturnia pavonia* near Newbury on March 30th; *Callophrys rubi*, *Euchloë cardamines*, *Erynnis tages*, *Pyrgus malvae* and *Pyrausta nivalis* at Eynesford, April 12th; *chiasmia clathrata* in swarms at Bexley, April 13th; three *Vanessa atalanta* at Yarmouth, I. of W. (one a very worn female), on April 18th. The last record

raises the question as to whether these were migrants or had hibernated here.—L. W. NEWMAN; Bexley, Kent.

The following early dates at Ross-on-Wye, Herefordshire, may be of interest: *Pieris rapae*, March 30th; *Euchloë cardamines* and *Pararge aegeria* well out on April 1st; *Pieris napi*, April 7th; *Pieris brassicae*, April 12th; *Pararge megera*, April 28th. Also noted were *Tephrosia punctularia* on April 4th; *Venilia maculata* on April 20th; *Asthena candidata*, April 25th; and *Acidalia remutaria* on May 1st.—F. A. LEEDS; Wye College, Kent.

On the 1st April I was resting on some rough ground in Dorset when I observed a female *Nymphalis io* crawl slowly out of a disused rabbit-hole some 3 ft. from me. She remained still in the sunshine for a short time and then slowly opened and closed her wings. After sunning herself for some fifteen minutes, she flew off with a rather weak flight. It struck me that the rabbit-hole might have been used for hibernation. I can also record the following: *Polygonia c-album* (dark ♂ form) flying in the Leith Hill district on March 10th last and darting at any specimens of *Brephos parthenias* which ventured near; worn males of *Pararge aegeria* in Dorset on 1st April, they had apparently been on the wing for at least two or three days; *Pieris napi* on 4th April (Hants); and *Euchloë cardamines* in my garden here on the 12th April.—A. GRANVILLE WHITE; Hill Top House, Chaldon, Surrey, April 22nd, 1938.

It is worth recording that Mr. John Moore saw ten *Vanessa atalanta* flying in the sunny rides of a larch plantation at 500 ft. elevation on Bredon Hill, 12 miles S.W. of Worcester, on March 31st. He took one, which is a male in good condition and now at Rothamsted Experiment Station. *Aglaia urticae* and *Nymphalis io* were also on the wing there, but when the spot was revisited on April 13th, although these "control" insects were "still common", only two *V. atalanta* remained. There is no proof that the captured male hibernated in England, as a few immigrants have been reported six weeks before the average date expected. The following were recorded flying north: *V. atalanta*, two at Brighton, March 21st (one was seen at Peel, Isle of Man, on March 14th); *Vanessa cardui*, two landed, tired, from overseas at the Start, 9.48 a.m., March 26th (one seen at Penzance, March 3rd, and others at Carmarthen and Haslemere, 24th to 29th—*Entom.*, 71: 83); *Plusia gamma*, three arrived on lantern of Start Lighthouse at 9.30 p.m. on March 26th (no others seen before Easter); but of *Macroglossa stellatarum* two were seen at Plymouth, March 7th, and others at Eastbourne, March 22nd and April 3rd. A female *V. atalanta*, the second seen there, was marked R742 and released at Stroud (Glos.) on April 12th (T. B. F.). (Capt. T. DANN-REUTHER, R.N.; "Windycroft", Hastings, April 4th, 1938.

Other notes received include the following: Eight or nine *Pararge aegeria* and *Euchloë cardamines* in plenty at Aston Ingham, Herefordshire, on April 7th (F. A. Leeds); *Acronycta psi* on April 11th and *Smerinthus tiliae* on April 26th at Sutton, Surrey (C. J. Paton);

Vanessa atalanta at Langdon Hills, near Laindon, Essex, on April 19th (A. Miles).—N. D. R.

EARLY APPEARANCE OF PHLOGOPHORA METICULOSA AND DEMAS CORYLI IN 1938.—On March 28th I saw two specimens of *Phlogophora meticulosa*, and later in the same evening I was surprised to take one *Demas coryli* on an electric lamp on the outskirts of this town.—GEORGE H. YOUTEN; 63, Salisbury Road, Dover.

SESIA SPHEGIFORMIS (CAPTURED ON THE WING.—In the Chiddingfold area at about 4 p.m. on May 22nd, a very warm and sunny day, I noticed a Clearwing hovering over some huckle, and on netting it I was surprised to find it was this species. The early date seems worthy of note as well as the time of flight.—C. G. M. DE WORMS; Milton Park, Egham.

TETRAMORIUM CAESPITUM L. (HYM. FORMICIDAE) IN THE NEST OF FORMICA RUFA L. (HYM. FORMICIDAE).—On February 10th Colonel Fraser showed me some nests of *Formica rufa* L. in Talbot Woods (Bournemouth). Whilst digging up a small colony of *Formica rufa* L. I found a small colony (about 60 or 70 ♀ I did not find a ♀) of *Tetramorium caespitum* L. in the bark of an old tree-stump, round which the *rufa* nest was built. This appears to be the first record of *T. caespitum* being found in a nest of *F. rufa*, in a wood, or under the bark of a tree. *T. caespitum* usually makes its nests in the earth in open spaces, and though Schenck records it as occurring in woods on the Continent, Forel states that this is seldom the case. Whether, in fact, the *T. caespitum* were living in parabiosis with the *F. rufa* or not cannot be decided, since the *T. caespitum* have left the nest, owing to its having been disturbed. A possible explanation is that, owing to their original nest having been disturbed, the *T. caespitum* entered the *F. rufa* nest while the latter were still dormant.

—B. D. W. MORLEY.

[Another explanation appears to be that the *T. caespitum* were there first.—N. D. R.]

DIPTERA IN DUMFRIES-SHIRE.—The year 1937 was very unfavourable for insect life in this district, and many species of Diptera which are generally common were comparatively rare. The following are additions to the local list: *Boletina dubia* Meig. was swept from a damp hedge bottom in May. *Leia fascipennis* Meig., not uncommon in September. *Androvandiella coxendix* Verr., generally distributed and not rare from June to August. This fly was first described by Verrall in *Ent. Mo. Mag.*, 1912, 22. *Uricotopus tremulus* Lin., common in spring and autumn. Can be beaten from Ulex. *Chironomus plumosus* Lin., common. My specimens were taken in April from a fence built of railway sleepers. *Anatopyma trifascipennis* Zett., common in May and also frequents Ulex. *Culex pipiens* Lin. is abundant on the moors in summer. *Sargus iridatus* Scop., I took a specimen in my garden on June 14th. *S. flavipes* Meig., swept along the edge of a mixed wood at Nutberry in August and September, but decidedly scarce. *Microchrysa polita* Lin., widely distributed on waste ground in June and July, and probably

continues much later. *Empis pennaria* Fall., taken occasionally in June, females predominating. *E. chioptera* Fall., common in May by sweeping long grass. *Hilara nigrina* Fall., a specimen on a house window on July 16th. *H. obscura* Meig. occurs on Newton and Nutberry Mosses in July and August. *Microphorus holosericeus* Meig. (*velutinus* Macq.) found on the banks of the River Kirtle at the end of May. Apparently uncommon with us. *Dolichocephala irrorata* Fall., near Gretna, by sweeping *Caltha* flowers in May; also near Springfield in July, where there was no *Caltha*, and in a dry, grassy lane at Eastriggs in August. *Drapetis curvipes* Meig. (*aterrima* Curt.) occurs in moss in woods, my specimens being taken between February 21st and May 5th. It is not common. *Tachydromia pallidiventris* Meig., not uncommon, at least in August and September, along the edges of woods. *Dolichopus brevipennis* Meig., Newton Moss in June. *Hercostomus chaerophylli* Meig., Nutberry Moss in July, a single female. *Gymnopternus cupreus* Fall., not rare on the peat mosses in June. *Liogaster splendida* Meig., on Umbels at Gretna on July 29th—a month later than Lundbeck's latest date. *Chilosia albitarsis* Meig., not uncommon in the Gretna district in buttercup flowers in May. *Catabomba (Lasiophthicus) pyrastris* Lin., taken several times in my garden at flowers in July. Not common in my experience. *Syrphus albostrigatus* Fall., a female at Brow-houses on June 5th. *S. corollae* Fab., occasional; a male on Newton Moss in August, and a female at Springfield in June. *S. luniger* Meig., one in my garden on September 10th. *S. ribesii* Lin., common from May to October. *Sphaerophoria menthastris* Lin., fairly abundant and widely distributed from July to the beginning of September. *Syritta pipiens* Lin. is abundant on uncultivated land all summer. *Chrysotoxum arcuatum* Lin., rare, but I have taken one or two specimens each year for several years. It occurs on Umbels. Lundbeck (Dip. Dan.) gives July 8th as his earliest date. I caught one at Springfield on May 22nd, 1935.—JAS. MURRAY; 6, Burnside Road, Gretna, Dumfriesshire.

NOTES ON BREEDING MNESIPATRIS FILICIVORA (MEYRICK).—On December 9th, 1937, Mr. Bryan Beirne of Dublin kindly sent me a frond of *Dryopteris (Lustria) filix-mas* containing a number of very small larvae of *M. filicivora* (see *Entomologist*, September, 1937). After about three days the frond became dry and brittle, so I put it in a breeding-cage along with two fronds of hart's tongue fern, with the stems inserted in a bottle of water. They left the old plant and took readily to the change of diet, working their way into the spores and into the long gallery or chamber beneath. I could see no signs that the spores had been eaten, and think they fed on the green matter at the base: the grass was greenish in colour. They made their way along the channel of the spore receptacle and entered the frond itself, some at the midrib end and others at the marginal. After a few days transparent blotches were noticed. These rapidly spread as the larvae grew in size, and by holding up the fronds to a strong light, I could see the movements of the head and the mandibles

working as they consumed the inner substance of the fronds. They left their habitation when full fed by perforating the upper surface, and pupated in sand and peat provided for that purpose. Though I was careful to pack the stems tightly, two of them found their way down into the water-bottle, so they must have closely followed the stems and not let themselves down by silken threads. They were full fed by January 3rd, 1938, and the first moth emerged on March 24th. The cage has been kept indoors in a warm room and the pupating period under these conditions is nearly three months. Mr. Bryan states that it is possible to have a succession of broods throughout the year. Up to time of writing—April 2nd—I have had seven moths, all of which emerged during the late afternoon and evening.

The larvae of *M. filicivora* differ much from some local *Teichobra verhuelletta* Staint. which I bred some years ago. The latter made a silken chamber or pad amongst the spores of the hart's tongue and fed therein, not mining and blotching the fronds as in the case of *M. filicivora*. The following is a description of a full-fed larva examined January 3rd, 1938.

Length 6.30 mm., broad and rather flat the width from third to tenth segments 1.25 mm. Head dark brown, on the crown a narrow line of light brown which dips in centre and forms a rounded loop on upper part of face. First segment with a dark brown plate. Rest of larva light yellowish green, with a very broad dark green stripe down the centre, which shows up clearly between the fourth and eleventh segments. This green band occupies fully one-third of dorsal surface. All the segments are clearly defined. The head is narrower than first and second segments, and then the larva is cylindrical to the tenth, afterwards tapering to the anal. The spiracles are not marked, being the same colour (yellowish green) as the surrounding area. There are a few light and very fine hairs on face and anal segment, with a few scattered ones along sides of body.—ALBERT E. WRIGHT: Grange-over-Sands, April 2nd, 1938.

RECENT LITERATURE.

United States Department of Agriculture

No. 144, *Cockroaches and their Control*, No. 145, *Clothes Moths*, No. 146, *Bedbugs*, No. 147, *House Ants*, No. 149, *Silverfish*, by E. A. Back; No. 152, *How to Control Fleas*, by F. C. Bishopp.

These leaflets, each priced at five cents, contain the essential facts about each of the insects or groups of insects cited, their habits and life-histories, and control measures against them. The illustrations are good throughout, with the exception of the figure showing the adult of the case-bearing clothes moth, which would be of little value in helping to distinguish this species from the others. No mention in this leaflet is made of *Borkhausenia pseudospinetella* Stn.—a somewhat surprising omission, unless the insect is much less destructive

in America than over here. Naturally, since these leaflets are intended for the guidance of those living in the United States, various insects are mentioned which do not occur in this country, more especially in that referring to ants. *Monomorium pharaonis* and *Tetramorium caespitum* are the only two species mentioned which are firmly established in Britain, though the Argentine ant *Iridomyrmer humilis* Mayr (not *pruinus* Roger var. *humilis* Mayr as in the leaflet) and *Camponotus herculeanus pennsylvanicus* De G. have been recorded in this country on various occasions, but do not appear to have become established in any marked degree. The leaflet on the silverfish suggests that this insect is more destructive on the other side of the Atlantic than over here—the few established records of damage in this country are in no way comparable. With regard to the control measures, it is perhaps a little surprising to see carbon disulphide recommended so freely, even with the italicized caution as to fire and explosion risk. In the Bedbug leaflet the use of methyl bromide is advocated as being much less toxic to human beings than HCN. While this is, of course, quite true, it would be as well to point out that high concentrations of methyl bromide vapour have been fatal on more than one occasion in this country. Corrosive sublimate is recommended in two of the leaflets, again with attention drawn to its toxic properties, whilst thallium sulphate seems an unnecessarily dangerous substance to incorporate in a poison bait for ants. Lastly, paradichlorobenzene dissolved in carbon tetrachloride is recommended as a spray for silverfish without any warning given as to the danger to human beings of using the latter. A number of fatalities have occurred in this country and elsewhere from the use of carbon tetrachloride for various purposes.—A. W. McK. H.

The Observer's Book of British Butterflies. Compiled by W. J. STOKOE. F. Warne & Co. Pp. 192. 154 illustrations. 2s. 6d.

This is really an abridged edition of South's *British Butterflies*, and being only about $5\frac{1}{2}$ by $3\frac{3}{4}$ in., really will go into the pocket. Every species is represented in colour, and with very few exceptions the larva, pupa and egg also of every species are shown in black and white. All the figures are introduced into the text, so that they come to lie conveniently alongside the descriptions. An admirable little book; we believe the first edition has already sold out.

Report of the Marlborough College Natural History Society for the Year 1937.

The annual Insect List published in this report shows that 1937 was, at Marlborough as elsewhere, rather a poor year, although a few locally "good" species, such as *Hypochalcia ahenella*, *Pyrallis costalis*, *Drymonia chaonia*, *Polyplocia ridens*, *Gastropacha quercifolia* and *Ephyra porata* turned up. Only Lepidoptera are listed, and the phenological list shows wide differences in the times of first occurrence of the selected species.

N. D. R.

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[No. 902

APLASTA ONONARIA AT FOLKESTONE.

BY A. M. MORLEY.

ON June 26th, 1937, I was exploring the Folkestone Warren, when I put up and caught a small pink moth, which was readily identified as *Aplasta ononaria*. After walking about for twenty minutes without seeing any more I sat down to have another look at my capture, but could not find it in any of my pockets. The only thing seemed to be to retrace my steps in the hope of finding where I had dropped it. Almost as soon as I had started back two more flew up in rapid succession, and a little later I was lucky enough to find in the middle of a bush the pill-box containing the first I had taken. All three were in excellent condition. One was kept for a few days in the hope of obtaining ova, but unfortunately turned out to be a male.

The next day, in similar weather, I visited the same spot in company with a friend, but though we worked hard we were quite unsuccessful.

On the 29th, another fine day, but rather windy. I spent the afternoon there. No *ononaria* were seen in the original spot, but eventually one flew out of a bush not far off, and after flying about ten yards, settled on some restharrow, where it was easily captured.

July 1st was another warm day, but there was a fair amount of wind. For nearly an hour I searched unsuccessfully, until I tried beating the bushes. In the next hour five were put up in this way, looking for all the world like pink *Campptogramma bilineata*; but of these, two flew out of reach. At the end of the afternoon a female was seen on a patch of restharrow, apparently in the act of depositing ova. Two or three sprigs of the plant picked from this spot were found to have on them a number of ova, 30 in all.

A further visit was paid on the evening of that day, but though plenty of geometers were flying about no *ononaria* were seen.

A final visit was paid on July 5th, but it served only to show that *ononaria* was over.

The eight specimens I took were generally smaller and more heavily marked than some I had taken in France earlier in the year. That they were all in fresh condition, were observed in the short period from June 26th to July 1st, and occurred in a small area measuring roughly 20 yards by 50 yards, may be taken as conclusive proof that they were the descendants of a single female

which had somehow or other found its way to the Warren during the previous summer.

Although the males have been taken at light, *ononaria* seems to be primarily a day-flying insect, taking readily to the wing in warm windless weather, and soon settling on the restharrow or in bushes.

The female taken on July 1st was placed over some restharrow growing in a pot, and lived until July 8th. It was exceedingly inactive but managed to deposit forty-one ova. These, like those found on July 1st, were laid towards the ends of the sprays, on both leaves and stems, and nearly always in groups of about a dozen, though a few were laid singly.

Two more were found on a piece of restharrow which was brought from the Warren to be potted up, and this brought the total up to 73, of which 71 hatched.

The larvae made their appearance between July 13th and 16th, and were yellowish brown and semi-transparent. They fed on the epidermis of the leaves and occasionally on the flower-buds. Between July 20th and 24th they entered on their second instar, when they became greenish and their short white hairs were plainly visible. They were short and stumpy, and exceedingly sluggish, neither looking nor behaving like ordinary geometrid larvae.

At the end of the month they again cast their skins. They were troublesome creatures to deal with, for they were often too lazy to move to a fresh piece of the food-plant, with the result that as the restharrow soon became mouldy some of them died.

At this stage they were so small and were growing so slowly that it looked as if something might be wrong. On the chance of being able to find some wild larvae with which to compare them, I visited the Warren on August 7th, and after a long search found three, which proved to be equally small.

A day or two later the larvae began to moult for the third time, but they still grew very slowly. From August 12th onwards they one by one ceased feeding and turned brown, evidently making ready for hibernation. This preparation is no doubt spread over more than a week, for on August 15th I found, in the Warren, three larvae, and on the 20th four more, which were still green. By the 25th all had ceased to feed, a considerable disappointment to those who had expected that the insect would be double-brooded in England as it is on the Continent.

It is evident that instead of having one brood in May-June and another in August, it has, in this country, a single brood in June-July, and hibernates in the larval state for a very long period. It will be interesting to discover whether the larvae in the Warren, which I believe to have been fairly numerous last summer, will emulate their predecessors and live through an English winter.

It can hardly be supposed that the species has not previously bred in this country, but of the not very numerous specimens of which details are available it may be inferred that the majority were immigrants.

For the following information I am indebted to the kindness of Mr. Bernard Embry, who has gone carefully through the existing records.

A. The first specimen was taken in the Warren by Mr. Bernard Piffard. Barret gives the date as July 18th, 1866, but Dr. Knaggs, in his notes, which were published in 1870, gives it as August, 1867.

B, C. Both Barrett and Knaggs refer to two specimens taken also in the Warren by Mr. F. O. Standish in July, 1869.

D. Mr. W. Purdey took one in the Warren in 1871 (Barrett).

E. Mr. C. Bailey took one at Folkestone on August 3rd, 1877. This was sold as part of Mr. C. E. Fry's collection (1895, *Ent. Record*, 7 : 316).

Mr. C. A. Briggs, writing in the *Entomologist's Record* (1896, 8 : 13), says that only seven specimens were known :

A, taken by Mr. Piffard ;

B and C, and a third, taken by Mr. Standish ;

Two taken by Mr. Holyday ;

D, taken by Mr. Purdey.

F. Mr. E. L. Street, writing in the *Entomologist's Record* (1910, 22 : 117) says that he took one in the New Forest on August 24th, 1909.

G. Mr. H. G. Gomm, in the same periodical (1924, 57 : 112), says that he took one " in the South of England " on July 12th, 1923.

H. Mr. A. W. Hughes took one at light on Romney Marsh on August 20th, 1932.

I. Mr. Demuth took one in the same place on August 6th, 1934.

Both H and I are mentioned in the *Entomologist* (1936, 69 : 107).

From what has been said above it may be supposed that all the specimens taken in August were immigrants. It seems, however, quite probable that those taken by Mr. Standish (B and C) and Mr. Gomm (G) were the descendants of immigrants.

9, Radnor Park West,
Folkestone ;
March 8th, 1938.

PYRAMEIS ATALANTA IN NOTES. —On June 3rd, 1938, I saw a very worn specimen of *atalanta* settled on the wall of my house ; it had a large bit out of the left hind wing. It seems very early in the year for this to be a foreign specimen ; by the size of the abdomen it looked to be a female. —P. WYNNE ; Upton House, Upton, near Newark, Notts.

AN ANNOTATED LIST OF SPECIES OF HEMIPTERA-
HETEROPTERA NOT HITHERTO RECORDED FOR
MIDDLESEX.

BY D. C. THOMAS, B.Sc., A.R.C.S.

THE Heteroptera of Middlesex have not yet attracted any special attention from Hemipterists and others interested in faunal surveys, therefore it seemed desirable to publish these additions to the species already recorded as occurring in the county in Butler's *Biology of British Hemiptera-Heteroptera* (1923), and at the same time to insert notes on the biology of the species where we have been able to add to existing knowledge. The district of West Middlesex is, moreover, of particular interest for other reasons, and deserves far more attention than it has yet received. Lying, as it does, on the boundary of the area covered by glacial invasion, and forming the junction of the river gravels and clays of the Thames basin with the chalk outcrops of the Chilterns, this region provides interesting comparisons with the rich area south of the Thames, which was the last part of this island to be linked by a land bridge with the Continent. Further, the district will very soon be engulfed by the spread of suburbia, and will probably lose its most attractive localities to the dominance of bricks and mortar. We should, therefore, welcome any information, even of the commonest species of Heteroptera, as we hope to complete the county list as far as possible, and make comparative analyses of it and of that for the corresponding area south of the Thames.

The addition of 88 new species brings the county total to 242, a figure close to those for the adjacent counties of Bucks and Herts.

We are indebted to Mr. W. E. China, M.A., of the British Museum (Natural History), for his kindness in giving us much help in the determination of some of the material, and for allowing us to examine the British Museum collections of Heteroptera.

The nomenclature used in the list is that of the text of Butler's *Biology of British Hemiptera-Heteroptera*, which under the present conditions of nomenclatural flux will probably be the most familiar to the majority of workers.

Pentatomidae.

Sehirus bicolor L.—Abundant all along the Colne Valley and along the banks of the Thames on its food-plants—*Ballota nigra*, *Lamium album* and *L. purpureum*. May be found as adult throughout

the whole year, as both sexes live underground during the winter, and survive the date of oviposition in late May or June by as much as six weeks. Uxbridge 2.v.33, Harefield 29.vii.33, Staines 13.iv.35, etc.

S. luctuosus M. & R.—One ♀ at roots of grass on railway bank, Uxbridge 28.vii.34.

Neottiglossa pusilla Gmel.—Last instar nymphs in grass and *Trifolium dubium* in chalk pit, Harefield 10.viii.33 (adults by 15.viii.33). One ♀ on *Festuca*, *ibid.* 8.ix.34; one ♂ on *Agrostis*, *ibid.* 12.ix.34.

Euscoris melanocephalus Fabr.—Late instar nymphs abundant on *Stachys sylvatica*, Hillingdon 8.viii.36. Adults by 16.viii.36, feeding only on plant juices.

Piezodorus lituratus Fabr.—Common wherever *Ulex* occurs. Uxbridge 17.viii.34, 22.iv.35, 16.iii.36; hibernates as imago.

Picromerus bidens L.—Common on *Betula* and *Salix*; Uxbridge 11.viii.33.

Troilus luridus Fabr.—Common on *Alnus*, *Corylus* and *Fraxinus* in summer 9–20.viii.33, 12.ix.35, and hibernates in *Abies*; 6.iii.34 Colne Valley, Uxbridge.

Zicrona caerulea L.—One dead under holly bush, Harefield 8.ix.34.

Acanthosoma haemorrhoidale L.—Abundant on *Crataegus*, Uxbridge 27.viii.33, Ruislip 11.viii.34.

Elasmostethus griseus L.—Abundant on *Betula alba* vii–ix.33–36, Uxbridge. Hibernates in *Abies* 6.iii.34.

Coreidae.

Coreus denticulatus Scop.—One in grass in chalk-pit, Harefield 16.viii.33; 1 ♀ ovipositing on *Hieraceum* leaves, *ibid.* 14.vi.34, presumably after hibernation as imago.

Myrmus miriformis Fall.—One ♀ in long grass, Harefield 16.viii.33; one ♂ on *Melampyrum*, Ruislip Woods 7.viii.35.

Berytidae.

Berytus clavigipes Fab.—Common on *Ononis*, Harefield; one macropterous ♀ there 13.viii.33.

B. signoreti Fieb.—Rare in moss and short grass on railway banks, etc., Harefield 10.viii.33, Uxbridge 2.vi.34.

B. crassipes H.-S.—Not common in grass and among *Cerastium vulgatum*, Uxbridge 6.iv.34, Harefield 14–20.viii.33, 10.viii.34, South Harefield 6.x.34.

Metacanthus elegans Curt.—Abundant on *Ononis*, Harefield 2.ix.35.

Lygaeidae.

Nysius thymi Wolff.—One ♂ in moss, Harefield 17.ix.33.

Cymus glandicolor Hahn.—Harefield Moor in *Juncus*, *Iris* 7.viii.33.

C. melanocephalus Fieb.—Harefield Moor, *Juncus* 19.ix.34.

C. clavicornis Fall.—Under *Polygonum* in sand-pit, South Harefield 7.viii.33.

Ischnorhynchus resedae Pz.—*Betula* 12.ix.35, nymphs on *Alnus* 27.viii.35; hibernating in *Abies* 6.viii.34.

Ischnodemus sabuleti Fall.—A large colony in a patch of *Arundo phragmites* by the Grand Union Canal, Harefield. Hibernates as adult in dead leaves of its food-plant, egg-laying in May and June, the larvae of which become adult by second week in August. On 12.ix.35 109 brachypterous males, 85 brachypterous females, 49 macropterous males and 78 macropterous females were taken from the colony. Also occurs sparingly on *Carex* at Uxbridge 12.v.34.

Chilacis typhae Perr.—Two ♀♀ on *Typha communis* seed-heads, Uxbridge 7.viii.34.

Rhyparochromus chiragra Fab.—Common and widely distributed at roots of grass, in moss and rubbish, taken frequently throughout August, September, and also in May, 1933–36.

Plinthinus brevipennis Latr.—Common in rubbish, Uxbridge 25.vii.35.

Stygnocoris fulgineus Geoffr.—In sand-pit, South Harefield 29.iii.34.

Peritrechus geniculatus Hahn.—Common, often with *R. chiragra*, Uxbridge, Harefield, Ruislip and Ealing.

Drymus piceus Flor.—Six specimens at roots of *Juncus*, Harefield Moor 17.ix.32.

Notochilus contractus H.-S.—Everywhere in rubbish, haystacks, gardens and hedge-bottoms, but never abundant in any one place.

Scolopostethus decoratus Hahn.—Common under *Erica*, Ruislip Common 20.ix.34.

Gastrodes ferrugineus L.—*Pinus sylvestris*, Uxbridge viii.33.

Tingidae.

Acalypta cervina Germ.—Three in moss and *Luzula* in chalk-pit, Harefield 12.ix.34.

A. parvula Fall.—Common everywhere in moss and at roots of grass, Uxbridge 1.x.34, Harefield 11.ix.34, etc.

Dictyonota tricornis Schrk.—A few under dead *Rumex* leaves in sand-pit, South Harefield vii.34.

D. fuliginosa Costa.—A few on *Cytisus*, Hillingdon 8.viii.36.

Monanthia fabricii Stål.—Common in moss, Uxbridge and Harefield 29.ix.33, 6.x.34 and 18.ix.35.

Aradidae.

Aradus depressus Fab.—One ♂ crawling on fence, Ealing 17.v.37. In confinement inserted its stylets into white fungal hyphae from rotten wood, but did not appear to push them along the length of the hyphae. They were extended about 3 mm. beyond the tip of the labium.

Hebridae.

Hebrus ruficeps Thoms.—Common in *Arundo* beds, Harefield 12.ix.35.

Gerridae.

Gerris argentatus Schum.—Ponds, Uxbridge 9.ix.34, 26.ix.35.

Reduviidae.

Ploiariola culiciformis De G.—To light at window, Uxbridge 17.viii.34. A few in roof of chicken-coops, Uxbridge 28.viii.35.

Nabis lativentris Boh.—*Urtica*, Uxbridge 12.ix.35. Nymphs feeding on root-feeding *Aphidae*, Hillingdon 17.vi.36.

N. ericetorum Scholtz.—A few under *Erica*, Ruislip Common 20.ix.34.

Saldidae.

Salda orthochyla Fieb.—Edge of pond, Hillingdon 26.ix.35; on mud flats, Ruislip Reservoir 20.ix.34.

Cimicidae.

Xylocoris ater Duf.—Under pine bark, Hillingdon 2.iv.33. In chicken-coop in company with *Xylocoris campestris* and many mites, Uxbridge 28.viii.35.

Capsidae.

Pantilius tunicatus Fab. - *Betula*, Uxbridge 12.ix.35. Nymphs on *Alnus glutinosa*, Uxbridge 27.viii.35, were seen to maintain their position on a tilted and shaking leaf by exerting the anal end of the gut and applying it to the leaf-surface. These nymphs also used this curious method of holding on when walking up glass in confinement.

Phytocoris dimidiatus Kb.—*Quercus* and *Crataegus*, Uxbridge 4.vi.33, 17.vii.33, 27.vii.35 and 12.ix.35. An unusually long period of maturity.

P. reuteri Saund.—*Crataegus*, Uxbridge 12.ix.35.

Megacoelum beckeri Fieb.—One ♀ on *Pinus sylvestris*, Uxbridge 24.vii.33.

Adelphocoris lineolatus Goeze.—A few on *Ononis*, Harefield 22.vii.33.

Calocoris roseomaculatus De G.—One last instar nymph in sand-pit, South Harefield 22.vi.33. Not typical country for this species.

Dichfooscytus rufipennis Fall.—On *Pinus sylvestris*, Uxbridge 23.vi.33.

Plesiocoris rugicollis Fall.—Common on *Salix*, Hillingdon 17.vi.33.

Lygus viridis Fall.—Common on *Tilia*, Uxbridge 20.vi.33. Abundant on *Tilia*, Ealing vi-vii.37.

Bryocoris pteridis Fall.—A few on ferns, Colne Valley, Uxbridge 12.ix.35.

Dicyphus errans Wolff.—Common on *Urtica* and *Stachys*, Harefield 7.viii.33, 10.ix.34. A large colony on *Senecio viscosus* at Uxbridge, mostly nymphs on 25.viii.35 and all adult by 17.ix.35.

D. globulifer Fall.—Common on *Lychnis dioica*, Uxbridge 17.viii.35. Hillingdon 30.viii.35.

D. annulatus Wolff.—Abundant on *Ononis*, Harefield 2.ix.35.

Pilophorus cinnamopteris Kb.—One last instar nymph on *Pinus sylvestris*, Uxbridge 8.viii.36.

Cyrtorrhinus flaveolus Reut.—Three brachypterous females in *Juncus*, Harefield Moor 5.ix.35.

Orthotylus bilineatus Fall.—Abundant on *Populus tremula*, Hillingdon 17.vii.33; 1st instar nymphs, *ibid.* 1.vi.37; 4th instar nymphs, *ibid.* 26.vi.37.

O. flavinervis Kb.—*Salix* and *Alnus*, Uxbridge 22.vi.33.

O. marginalis Reut.—*Salix* and *Ulmus*, Uxbridge 1.viii.35, 8.viii.36.

O. viridinervis Kb.—*Alnus glutinosa*, Hillingdon 8.viii.36.

O. prasinus Fall.—*Ulmus*, South Harefield 28.vii.35; *Ulmus*, Ruislip 4.viii.36.

O. ochrotrichus Fieb.—*Ulmus*, Ruislip 4.viii.36; *Populus tremula* and *Salix* sp., Hillingdon 8.viii.36.

O. chloropterus Kb.—A few on *Cytisus*, Hillingdon 8.viii.36.

O. concolor Kb.—Three females on *Cytisus*, Hillingdon 8.viii.36.

O. adenocarpi Perr.—Abundant on *Cytisus*, Uxbridge 17.vi.33.

Heterocordylus tibialis Hahn.—Abundant on *Cytisus*, Uxbridge 16.vi.33.

Onychumenus decolor Fall.—*Holcus lanatus*, Uxbridge 23.vii.35.

Oncotylus viridiflavus Goeze.—↓ ♀ on *Ononis*, Harefield 22.vii.33. Common on *Centaurea nigra*, 27.vii.34 and 1.viii.35.

Conostethus roseus Fall.—In dry grass, Hillingdon 17.vi.33.

Amblytylus brevicollis Fieb.—One ♂ in *Holcus*, Uxbridge 27.vii.34.

Macrotylus solitarius Mey.—Common on *Stachys sylvatica*, on the juices of which it will feed. Uxbridge 27.vii.34, 8.viii.36.

Harpocera thoracica Fall.—Scattered but not rare; generally

taken in the sweeping net among *Urtica* and *Mercurialis perennis* sometimes under oak trees. Uxbridge 16-20.v.33, 12.v.34; Harefield 5.vi.37.

Phylus coryli L.—Abundant on *Corylus*, Uxbridge 22.vi.33.

Plesiodema pinetellum Zett.—One ♂ on *Pinus sylvestris*, Hillingdon 26.vi.37.

Psallus betuleti Fall.—Common on *Betula*, Uxbridge 17.vi.33. Last instar nymphs and adults swarming on *Alnus glutinosa*, South Harefield 5.vi.37.

Ps. obscurellus Fall.—Common on *Pinus sylvestris*, Hillingdon 8.viii.36.

Ps. alnicola D & S.—*Alnus*, Uxbridge 27.viii.35.

Ps. vitellinus Scholtz.—Common on *Abies* sp., Uxbridge 20.vi.33. One male on *Pinus sylvestris*, Hillingdon 26.vi.37.

Plagiognathus albipennis Fall.—One female on *Artemisia vulgaris*, Ealing 2.viii.37.

Sthenarus rottermundi Scholtz.—Abundant on *Popula alba*, Uxbridge and South Harefield 31.viii.35; Ealing 11.viii.36. 1st instar nymphs on *Pop. alba*, Ealing 2.v.37.

Naucorudae.

Aphelochirus aestivalis Fab., forma *montandoni* Horv.—In gravel from bottom of swift-flowing parts of River Colne, Uxbridge 21.ix.35. Adults common in weed masses caught on bridge pylons 12.viii.32.

Corixidae.

Corixa panzeri Fieb.—A few from Swakeley's Pond, Hillingdon 2.iv.33.

C. dentipes Thoms.—Two males, Ruislip Reservoir 9.ix.33.

C. coleoptrata Fabr.—Ruislip Reservoir 17.viii.32.

Rothamsted Experimental Station,
Harpenden,
Herts.

EARLY BUTTERFLIES AT SWANAGE.—I visited the Swanage district on May 7th, and illustrative of the relative forwardness of the season, despite the cold spell in April, I found the following on the wing in fair numbers: *Pieris rapae*, *P. napi*, *Euchloë cardamines*, *Pararge aegeria*, *P. megeria*, *Coenonympha pamphilus*, *Callophrys rubi*, *Lycaena phlaeas*, *Aricia astrarche*, *Polyommatus icarus*, *Lysandra bellargus*, *Cyaniris argioides*, *Pyrgus malvae*, *Erynnis tages*. Single specimens of *Polygonia c-album* and *Vanessa io* were also seen together with one or two *Aspilates ochrearia*. The whole of the above were observed in a fold of the Downs along a rough path about 300 yards in length.—A. GRANVILLE WHITE; Hill Top House, Chaldon, Surrey, May 12th, 1938.

A NEW SUBSPECIES OF *LEPTIDEA DUPONCHELI* STDGR.

BY P. P. GRAVES, F.R.E.S.

THIS new subspecies of *L. duponcheli* was taken by me near Dil Iskelesi station on the southern coast of the Ismid Peninsula which forms part of the northern coast of the Sea of Marmora. It occurred on dry limestone slopes bearing a large number of Leguminosae in spring and dotted with small thickets and isolated bushes. The locality was very warm and the vegetation very Mediterranean in type. *Zerynthia cerisy*, *Lysandra bellargus*, *Leptidea sinapis*, *Cupido sebrus moreana*, *Melitaea trivia*, *Colias hyale*, *Lycaena admetus* and *Gonepteryx rhamni* were among the insects noted there in May and July.

L. duponcheli marmorae ssp. nov.

♂. Length from centre of thorax to apex of fore wing from 19.25 to 22 mm. Fore wings rather narrow. *Upperside*: Apical blotch large and very dark, prolonged in the form of cloudy submarginal scaling nearly always to med. 2, sometimes to the tornus. Spot at distal end of discal cell more strongly marked than in topotypical *duponcheli* from S. France. The costa adjoining the cell heavily scaled with black, the cell and basal area washed with lemon-yellow, which also extends from the base of the hind wing over from half to about two-thirds of its area. *Underside*: Apex of fore wing and discal cell pale yellow. Ground-colour of hind wing yellower than in most French *duponcheli*, but less yellow than in the Syrian *xanthochroa*, Vty. White dash in discal cell well marked; white submarginal blotch above the third radial usually restricted to interspaces 4 and 5.

♀. As in the male, but the apical area less heavily darkened on the upperside of the fore wing, and the yellow wash on the discal cell and base thereof is much fainter.

Taken in May at Dil Iskelesi, Asiatic Turkey, Constantinople—Ismid Peninsula on the Sea of Marmora.

Type, male, Dil Iskelesi, 2.v.1914, P. P. Graves; allotype, female, Dil Iskelesi, 2.v.1914, P. P. Graves; paratypes, 10 males and 2 females in coll. P. P. Graves (now in the British Museum (N.H.)).

I propose the name of g. aest. **marmorae secunda** for the summer brood occurring in July:

♂. *Upperside* differs from vernal form in its yellowish-cream ground-colour instead of white. The apical blotch does not entirely reach the distal margin (cf. *L. sinapis deserticola* Vty.), is much lighter, and is markedly prolonged towards the tornus. Costal near

discal cell dark. No light yellow wash in the cell and basal area of the fore wings. The yellow wash on the upperside of the hind wings is faint. *Underside* a darker shade of yellowish cream than the upperside. Apex of fore wing pale yellow. Hind wing lightly crossed by grey and shading.

♀. Rather deeper yellowish-cream ground than in male on both surfaces. The grey shading on the underside of the hind wing is much more extensive.

Type, male, Dil Iskelesi, 6.vii.1914, P. P. Graves; allotype, female, Dil Iskelesi, 6.vii.1914, P. P. Graves; paratypes, 2 males, 1 female in coll. P. P. Graves (now in the British Museum).

I will conclude by warning any entomologist who wishes to visit Dil Iskelesi that it is now a military area, and that the entry of tourists and strangers is prohibited owing to the construction of new fortifications protecting the Gulf of Ismid.

COSMOLYCE BOETICUS IN SAVERNAKE FOREST.—With reference to my note (*Entomologist*, 66 : 284) reporting occurrence of *Cosmolyce boeticus* in Savernake Forest, I have to express my regret for a wrong identification. The insects in question have been identified for me at South Kensington as undoubtedly *Rapala schistacea* (Moore)—distribution India, Burmah and Andaman Islands. I exhibited one of the specimens at a meeting of the South London Entomological Society on May 12th last, when it was pointed out to me that my superficial diagnosis was wrong and that the insect was certainly not *C. boeticus*. I then took it to South Kensington, with the above result. My brother—the captor of these specimens—again assures me positively that these are the three insects taken by him on August 22nd, 1922, in Savernake Forest, and, although he subsequently served in India, the idea that he might have mixed up Indian with British insects may, I think, be completely dismissed for the following reasons : (1) These three insects were placed by him, after setting, in the cabinet in which he subsequently showed them to me—which cabinet has never contained anything but British insects—and was left behind in England when he proceeded abroad. (2) In India, not being interested in foreign insects, he did practically no collecting—except for a few striking butterflies (chiefly Coliads) taken whilst on leave in Kashmir at 10,000 ft. up. He is absolutely positive that he took nothing in India in the least resembling these dull-looking and disreputably worn specimens. Accidental importation seems, therefore, the only possible solution. A number of these small butterflies on a migratory flight in the Indian Ocean may have settled on a home-bound ship and been blown off in the Bay of Biscay, or Channel, during the violent gales of the week preceding their capture. The three specimens are all females.—P. A. CARDEW (Col.) ; 21A, Thornton Hill, Wimbledon, S.W. 19.

THE LIFE STORY OF *APATURA IRIS*.

BY STANLEY MORRIS.

(Concluded from p 132)

The males usually gather at some vantage point, situate at the highest spot in their domain, and here they constantly manœuvre for the most favoured positions on some lofty oak, which commands an uninterrupted view of the ground below. Here they may be seen indulging in the sunshine in their graceful evolutions around the tree-tops, soaring at times high above them, or sallying forth from some favourite vantage point to give friendly battle to a rival. From time to time they are visited here by the females before the latter enter upon the more serious business of egg-laying in the more sheltered ground below.

Iris is not attracted to blossom at all, but is a moisture-loving species, and that not always of a savoury nature. It shows a great partiality for the discoloured exudation from the bark of oak trees, and will frequently settle on the limbs of the tree, around a nodule or other excrescence, where such exudation gathers, and greedily thrust its proboscis into the liquid for minutes together. After rain it will frequently settle on the ground and sup up moisture therefrom, and it loves to absorb the moist heat engendered by sunshine after rain on a sun-parched soil. For animal droppings, carrion and decaying matter of all descriptions and in any stage of putrefaction it shows a marked relish, and it has been frequently taken at "sugar" employed by the entomologist on tree-trunks.

Like many other insects, *iris* apparently has its cycles. It was at its best around the hot years, such as we experienced in 1921 and 1933. Intermediately, the insect holds its own, but in some years may not be more than sparsely represented.

Undoubtedly a wet autumn has more to do with its decrease than either a backward spring or a wet summer. Cold winters, on the other hand, have no effect upon its numbers and are, perhaps, more beneficial than otherwise. Such conditions tend to keep the larvae more uniformly dormant, whereas in mild winters they are restless and alert almost the season through. A genial spring seems to favour a preponderance of females over males, whereas in a cold, backward season males predominate.

A systematic clearing of the underwood in our large woods is essential to the well-being of the insect. It will quickly disappear from those woods which are allowed to look after themselves, and where the underwood is not subject to periodical cutting in rotation. Neither must the timber be too thick. Crowded woods are not favoured by the insect.

In the uplands *iris* revels in a fairly open country—not too densely timbered, where tangled bracken and clinging thorn are rampant, interspersed with scattered timber and bramble thickets; holding enough underfoot to deter any but the most curious; open to the sky above so as to admit sunshine freely, yet sheltered withal from rough winds and driving rain.

It is a common belief that this insect frequents only oak woods, and as these occur for the most part in the wealden portions of the county, so the insects' distribution is confined to the lower ground. This is a mistaken idea; the insect is equally partial to beech surroundings and the higher ground favoured by this tree, on the chalk, even up to 500-600 ft.

Sallows must be prevalent in no uncertain proportion, and where these grow among young ash or birch trees, there the insect will show a marked partiality, the inference being that the foliage on these trees is comparatively sparse, and whilst giving a certain amount of shelter, it does not keep out the sunshine unduly.

On the higher ground a north or north-east aspect is most favoured for the breeding site, and, whether on high ground or low, it is absolutely essential that there be ample shelter, afforded by growing timber or high undergrowth, on the south-west side.

Iris is normally single-brooded, but of late years it appears to have developed a tendency to produce a partial second brood. 1933 was a notable example of this. In that year my friend saw second brood *iris* on the wing on more than one occasion during the last week of September, and Mr. N. C. Pilleau, of Horsham, had the good fortune to breed an example which emerged successfully on November 23rd, after having been thirty-five days in the pupal stage. This was a male insect (*Entom.*, 67 : 40).

Again, in 1936, my friend Mr. James Shepherd, of Herne Bay, was similarly fortunate to rear a fine female insect which emerged on November 2nd, after having been in the pupal stage only twenty-five days. Through his courtesy I am able to give the instar periods of this insect throughout. They are : Ova hatched, August 1st; first moult, August 9th; second moult, August 24th; third moult, September 7th; fourth moult, September 22nd; set for pupation, October 6th; pupated, October 8th; emerged, November 2nd. The evenness of these periods is most interesting; the periods between the third and fourth moults and the last moult and pupation are the shortest I have ever known (*Entom.*, 70 : 43).

DISEASES.

Iris is not a difficult larva to manage in captivity, and, provided that it is "sleeved" out on the living tree and the "sleeve" changed from time to time, no serious drawbacks should arise. Care should

be taken that the foliage selected is of mature growth; immature foliage is apt to cause dysentery, in which case the larva loses its healthy colour and turns a dark sage green on the dorsal segments. At the same time it discharges a pinkish fluid in sufficient quantity to stain the muslin cover. Any larva so affected should at once be removed from the "sleeve", and the latter changed to a fresh position, ensuring that none but mature foliage is enclosed.

Larvae kept in confinement are sometimes subject to a kind of distemper, in which case they are covered all over with a dark-coloured oily fluid, which even runs off them on to the muslin cover. I have only known this occur during the last stage, after a change of "sleeve", and it may have been due to this cause or to the following.

Overcrowding in the "sleeve" should be studiously avoided as, in the last stage, the larvae are apt to attack one another, especially if a change of "sleeves" is effected. That they actually fight and apparently bite one another is evidenced by the marks of discoloration on the skin after the fray. The affected parts turn a dark brown colour. My friend once possessed a larva so pugnacious that he offered to match it against any larva that I could put up against it for any stake I liked to name!

In 1935 many larvae were affected in a curious manner after moulting for the last time. They seemed to be paralysed in the hinder parts, and quite unable to make use of the prolegs. In this condition they would frequently be found suspended, head downwards, on a thread of silk, and quite unable to help themselves. If put back on the leaf they failed to retain a hold of it, and reeled about in all manner of contortions, finally dropping to the bottom of the "sleeve". I think, possibly, this state of affairs was due to the cold wet season we experienced that year, as I have seen nothing like it before. Needless to say larvae so affected failed to develop further.

ENEMIES AND LOSSES.

Ichneumon.—The larva of *iris* does not seem to be prone to parasitic attack. This is somewhat surprising, seeing it is a "top of the leaf" feeder and, in its later stages, offers such a bold target to the enemy. The only instance that has come to my notice was communicated to me by the late Mr. G. Bertram Kershaw, of Wrotham Heath, Kent, who, in a letter, told me that in 1934 he had a larva "ichneumonised through the muslin sleeve", which attack he attributed to a species of *Agrionid*. I wrote to him for further details, but, unfortunately, he passed away shortly after his first letter, so that I have no further particulars.

The common brown garden ant (Lasius niger) is distinctly hostile

to larvae, especially in the early stages. As this species devotes itself principally to aphides, which frequent twigs and leaves, it is not surprising that the larvae are unfortunate enough to come under its attention. It will carry off the larvae in their first stages, and later will attack others when set for the moult.

The common earwig (Forficula auricularia) is not above suspicion of the strongest order, although I have no direct evidence against it. In the autumn of 1934 there was a remarkable wastage of larvae which could not be accounted for. During the month of September at least 50% of the larvae were missing from their webs, without the slightest cause to account for their disappearance except that earwigs were everywhere in evidence on the willows—to a greater extent than I have ever known them. Not unnaturally this pest came under very strong suspicion, and although never detected *in flagrante delicto*, I am pretty well satisfied that this loss of larvae could be laid at their door.

Anthocoris nemorum. This common bug, though scarcely more than 4 mm. in length, may be very destructive to the larvae in captivity should it happen to get into the "sleeve" unawares. It attacks the larvae when set for the moult, and I have seen no less than three insects so engaged on the same larva, with their heads deep buried in its body, sucking out its life juices with apparent relish. Although it seems to direct its attention to the larvae when set for the moult, I have no doubt that if not banished altogether from the "sleeve" it would extend its sphere of action further.

Birds.—Undoubtedly a certain amount of wastage of larvae is due to this cause, notably Titmice and the smaller species of *Phylloscopi*—very aptly so-named in this instance. To satisfy myself that birds will search out the larvae in their first stages, I placed five larvae, after the first moult, on a small willow in my garden, distributing them well over the tree and leaving this without any protecting cover. In addition to the *iris* the tree had many small larvae of a species of sawfly feeding on the lower foliage. For some days all went well and I counted my five larvae each morning, but about the tenth day I found three missing from their webs, and the culprit—a robin—had the temerity to leave his trade-mark on the foliage! So far as I could ascertain, the sawfly larvae were not molested at all, although these, from their habit of feeding on the edge of the leaf, were far more obvious to the eye than the *iris* larvae, snugly ensconced at the tip of the leaf. Evidently they were not so toothsome a morsel.

The most critical time for the larvae in a state of nature is when they leave the leaf for hibernation and, again, when they return to it in the spring. They are far more liable to attack when crawling up the stem than when resting on the leaf.

Cutting of underwood.—I have previously mentioned that the periodical cutting of underwood is essential to this insect's well-being. It would seem to be almost an anomaly, then, when I find it necessary to include under this heading the cutting of underwood as a local cause of this insect's undoing. Doubtless the toll of larvae from time to time by this means is considerable, but this loss is restricted to a limited area, and its occurrence in that area may happen only once in about fourteen years or even longer. So long as this cutting is carried out by rotation, and is not wholesale, so, in the long run, the insect benefits by the vigorous young growth produced by this timely clearance, and it is this rejuvenation of the undergrowth from time to time that tends to hold the insect to its habitats.

THE IDENTITY OF *ACOSMETIA MORRISII* DALE (IN MORRIS).

BY H. M. EDELSTEN, F.R.E.S., AND W. H. T. TAMS, F.R.E.S.

THIS moth, which was first described in 1837 (*Naturalist*, 2 : 88) from Charmouth specimens, was presumed to be a whitish form of *Petilampa minima* Haw. It was afterwards considered to be the same species as *Arenostola bondii* Knaggs, which had been taken at Folkestone sixteen years later. Different authors have since assigned it to both species, though Tutt, in *British Noctuae*, 4 : 99, correctly placed it. However, the discovery of three specimens in the Dale Collection in the Hope Department at Oxford, has resulted in this species being satisfactorily determined after one hundred years of uncertainty.

Through the kindness of Prof. G. D. Hale Carpenter we were enabled to make an examination of the genitalia of these specimens. The result proves that the Charmouth insect is not a form of *P. minima*, but is one and the same species as *A. bondii*.

The name *bondii* Knaggs will now become a synonym of *Arenostola morrisii* Dale (in Morris), by which name the insect should be known. A list of the more important references to this species is given below :

The Naturalist (April, 1837), 2 : 88 and errata.

HUMPHREY AND WESTWOOD.—*British Moths*, 245, pl. liv, fig. 12.

Ent. Rec. (May, 1890), No. 2, 1 : 34.

Ibid. (February, 1893), No. 3, 4 : 72.

TUTT (May, 1891).—*Brit. Noct.*, 1 : 47.

Idem (December, 1892).—*Ibid.*, 4 : 99.

Ent. Mo. Mag. (1909), 2nd ser., 20 : 179.

HAMPSON (July, 1909).—*Lep. Phal.*, 8 : 414.

SOUTH (1907).—*Moths of Brit. Isles*, ser. 1, 320.

MEYBECK (1895).—*Brit. Lep.*, 121.

Idem (1927).—*Ibid.*, 75.

NOTES AND OBSERVATIONS.

CURIOUS BEHAVIOUR OF *DANAUS CHRYSIPPUS*.—Mr. Heslop Harrison's note on p. 119 reminds me of a somewhat similar experience of mine in the New Forest many years ago. In one of the rides in Ironshill Enclosure I was momentarily deceived into thinking a dead leaf on a bracken frond was a female of *Argynnis paphia*, and just as I had decided that it wasn't, a male *paphia* came along and he, too, thought it was a female and paused in his usual headlong flight to investigate. He was not so easily convinced as I was, but eventually flew on. I have seen *Pieris rapae* similarly attracted by a scrap of white paper blown along the street, and, more remarkable still, *Macroglossum stellatarum* visiting scarlet "geraniums" on a window-sill, fly into the room through the open window and endeavour to extract nectar from red flowers on the wallpaper!—C. NICHOLSON; Tresillian, Cornwall.

EARLY APPEARANCES IN THE WEST IN 1938.—*Vanessa atalanta*, March 13th, Tiverton, Devon; *V. cardui*, March 3rd, Penzance; *Lycænopsis argiolus*, April 11th, Penzance, April 14th, Dawlish; *Lycæna phlaeas*, April 17th, Bodmin, *Pararge aegeria*, March 19th, Penzance, March 24th Plymouth; *Argynnis euphrosyne*, March 18th, Bodmin, *A. paphia* (?), March 28th, Mevagissey, Cornwall (identification doubtful); *Macroglossum stellatarum* (2), March 7th, both near Plymouth. C. NICHOLSON, Tresillian, Truro, Cornwall.

ABNORMAL FIRST APPEARANCE DATES—In view of the abnormal weather conditions prevailing in the early part of this year, I have compiled the following list of first appearances of various insects in different localities, as seen by either myself or my friends

<i>Argynnis euphrosyne</i>	.	.	.	Cornwall	.	April 14th.
"	"	.	.	Wilts	.	May 8th.
<i>A. selene</i>	.	.	.	Cornwall	.	April 27th.
"	.	.	.	Wilts	.	May 28th.
<i>Euphydryas aurinea</i>	.	.	.	N. Devon	.	May 6th.
"	"	.	.	Wilts	.	May 19th.
<i>Euchloë cardamines</i>	.	.	.	Wilts	.	April 9th.
<i>Pararge megera</i>	.	.	.	Cornwall	.	April 22nd.
<i>Lycæna phlaeas</i>	.	.	.	"	.	April 14th.
<i>Polyommatus icarus</i>	.	.	.	"	.	April 28th.
<i>Coenonympha pamphilus</i>	.	.	.	"	.	April 28th.
<i>Pyrgus malvae</i>	.	.	.	"	.	April 14th.
<i>Erynnis tages</i>	.	.	.	"	.	April 21st.
<i>Argynnis aglaia</i>	.	.	.	"	.	May 20th.

Lysandra bellargus (Wilts) were about two weeks, and *Leptosia sinapis* (Northants) and *Carterocephalus palaemon* (Northants) about one

week earlier than last year.—NORMAN WATKINS; Belcombe Court, Bradford-on-Avon, Wilts.

EUPHYDRYAS AURINEA IN HERTS.—While working a wood on the Hertfordshire-Middlesex border on May 22nd I was surprised to see a specimen of *Euphydryas aurinea*, which I captured. It was a small male of the dark south-eastern form, and in good condition. The ground where it was taken was an open hollow in a corner of the wood, the lowest parts, in which some Devil's Bit Scabious was growing, being marshy. No other specimens were seen on that or any subsequent day. It would be interesting to know whether it was the sole survivor of a colony, or had migrated from some near-by locality. So far as I know, however, the species does not occur anywhere in the neighbourhood, which is not more than twelve miles from London. (C. J. GOODALL, 427, Northolt Road, South Harrow, Middlesex, June 19th, 1938.

[There are a good many records of odd specimens of this species being found at considerable distances from the nearest known colony.—N. D. R.]

BOARMIA GEMMARIA LARVAE ON JASMINE.—In our Clapton garden (N.E. London) we had a large plant of the common white Jasmine growing on wall and trellis in a sheltered corner, and my sister and I used often to search on it for larvae of this species in the winter when the leaves were off. The larvae, then about half an inch long, used to eat the dark green bark, and the light green patches so produced gave us clues to the whereabouts of the larvae, and intensive "combing" of possible hiding-places followed. Needless to say the moths were always var. *perfumaria*, although Clapton is right on the edge of London, with the River Lea, marshes and meadows between it and Walthamstow. We used to search also on the yellow Winter Jasmine (*J. nudiflorum*), but to the best of my recollection never found a larva on that. Here we have white, yellow and red jasmines, and I have once found a larva (typical *gemma*, of course) on the white, and recently two on the red (*J. bresianum*), in each case revealed by the light green patches. These jasmine feeders take readily to ivy, a more convenient food-plant to manage.—C. NICHOLSON.

ARGYNNIS PALES SCHIFF. AND ALLIED SPECIES.—I have read with very great interest Gen. Cooke's recent article on *A. pales* (*Entom.*, 71: 39), and hope it may lead to a really complete morphological study being made of the various races at present grouped under that name. With a view to stimulating further interest in them I give the following data, derived from my personal experience of some of the races occurring in localities other than those from which Gen. Cooke obtained his specimens. I must admit, however, that I can add nothing to make the problem any clearer; rather the contrary.

Gen. Cooke describes very well the two familiar insects, *A. dirphya* (= *isis* Hb.) and *A. pales palustris* (for the sake of clearness I shall

refer to the former as a species in these notes). He says these two fly together on the Stelvio, at Obergurgl in the Oetzthal, and on the Arlberg Pass, and that he has not come on a transitional individual. My trouble has been that I find a good deal of difficulty in separating these two races, owing to the frequent occurrence of transitional individuals, and not only this, but in two localities I know of transitional races! Gen. Cooke in his description states that the females of *A. dirphya* invariably have black or purple suffusion on the upper-side. In this I feel sure that he must be under some misapprehension, for in twelve localities where I have taken it in Switzerland and the Dolomites, females the same colour as the males were always present.

A. dirphya, so far as I know, attains its finest development in the Savoy Alps. In those districts it is often so large that many females strongly resemble *A. mo*. I have taken it there in five localities (all in Switzerland, but geographically in the Savoy Alps), and in all the unsuffused females were as frequently seen as the dark ones, slightly suffused specimens being perhaps the most usual. The same applies to some localities in the southern Bernese Alps. In eastern Switzerland *A. dirphya* is very abundant in the Grisons. At Lenzerheide, where it occurs in hundreds, bright, unsuffused females were always present, though dark ones outnumbered them; a curious form of a paler colour than the male and slightly suffused with a greenish tinge was also abundant. At Pontresina and in two localities on the Karer Pass and on the well-known "Latemar Meadow" above the Karer Pass I also found both types of female. The Dolomite race I have at present included under *A. dirphya*; but I feel no certainty that this is correct. The males are not typical of that species, being smaller and much less yellow on the underside; the females are more typical, especially in the greenish colour of the underside, but they also are smaller. It is on account of the dimorphic female that I place these specimens as *A. dirphya*; if I knew that the female of typical *A. pales* was dimorphic I might be inclined to include them under it. The same remarks apply to the few specimens I have from Pontresina.

From the Savoy localities I have some small males, smaller than the others with which they flew but larger than *A. pales palustris* males, the colour of the underside being more as in the latter. I find it difficult to think that these small males are not *A. dirphya*, and wonder if it is such examples, together with clear brown females, which have led Gen. Cooke to assume that *A. pales* and *A. dirphya* fly on the same ground. In one locality only have I found the two together—on the slopes above the highest stretch of the Simplon Pass. Here both seem to me to be typical. Unfortunately, having many specimens from other localities I only took one or two, so cannot say if intermediates occur there. In all other localities I know the two seem separated by a more or less marked difference in altitude.

The intermediate races I mentioned previously occur in the Ueschinen Tal near Kandersteg between 4000 and 6500 ft., and on the Gemmi Pass from 5500 ft., to 6200 ft., and probably a little

higher. In both these localities the males are smaller than normal *A. dirphya*, and yet larger than *A. pales palustris*, and the colouring of the underside of the hind wing is neither so red as the latter nor so yellow as the former. The females (all I have seen) are without suffusion, in colour much as the males on the upperside and of the greenish tone of *A. dirphya* on the underside. The general impression I gather from these specimens is that they might be a local form of either species, but at present I would not care to hazard an opinion as to which.

Last summer I collected a small series in Carinthia, at the eastern end of the Hohe Tauern. This series I hope are typical *A. pales*. Their most remarkable feature is a marked likeness to the ssp. *alethea* (*arsilache* auct.), and if they are typical of Austrian *A. pales* in general, I can easily understand mistakes arising between descriptions of the latter and ssp. *alethea*. I have ten males only, but one of them has a large extent of the yellow colouring of *A. dirphya* on the underside of the hind wings and the apex of the fore wings. Which species this individual belongs to I cannot say. It was taken at the same time as the others on the first day they emerged.

If one goes a little further afield complications multiply. There is a fine race in the Pyrenees, in fact I am inclined to think there are two. The race of the Gavarnie district is said by Dr. Higgins to be intermediate between *A. pales* and *A. graeca* (*Entom.*, 63 : 199-203); the latter he holds to be a distinct species. I have often questioned if *A. dirphya* is distinct from the latter. Further to the west in the Pyrenees, above Eaux Bonnes, there flies a rather different form, approaching (but quite distinct from) the Hohe Tauern race; unfortunately I have no females. I have rather similar males from the Ticino. On the whole I incline to regard these males (both Pyrenean and Swiss) as a form of *A. dirphya*.

Eleven years ago I made a few dissections of some of the extremes of my Swiss specimens. As I had not previously mounted any specimens of Argynnids my technique left much to be desired; still the results showed one thing clearly: there exists much variability in structure which cannot be set down to distortion in mounting. Until one can establish how much of this is racial, how much local and how much individual, there will be no possibility of distinguishing the relationships of these races. I feel no doubt the details of their history are there to be read, but before one can hope to do so a great deal of research will be necessary. In Capt. Riley's footnote to Gen. Cooke's article he tells us that the genitalia of *A. dirphya* and *A. pales* are distinct, but has he made any extended examination of the less typical forms of these species? I quite lean to his view that there probably are two species in this group of races, but I can feel no certainty of how to differentiate between them.—B. C. S. WARREN; 3, Augusta Mansions, Folkestone.

* No; this statement was not intended to extend beyond the material discussed in Gen. Cooke's article. That material showed two types of genitalia so distinct that only the one conclusion was possible.—N. D. R.

RECENT LITERATURE.

Hymenopterorum Catalogus. Editus a H. HEDICKE. Pars 6 : Sirecidae, H. HEDICKE. 1938, pp. 1-32. Dr. W. Junk, Den Haag, Holland. Price 2.50 Dutch Florins (5s. 6d.), subscription price 2 Dutch Florins (4s. 6d.).

The sixth part of this ambitious catalogue of the Hymenoptera of the world has now appeared, with the announcement of several other parts already in preparation. Its value to all serious students of the group is inestimable. Unfortunately I have to repeat my criticisms of the first part (*Entomologist*, 69 : 147-148), the value of quoting synonymy depends on whose authority it rests, but this authority is not given. Furthermore, it is to be deplored that the author continues to emend names according to his own views as to how they should have been spelt. If, for example, we want to refer to *Sirex fantoma* Fabricius we cannot find it either under *Sirex* or *Urocerus*, nor even in the index at the end, until we discover that "*fantoma*" has been emended into "*phantoma*". The other emendations, *Sirex Abbotii* to *abboti*, *behrensi* to *behrensi*, *matsamurai* to *matsamurai* and *Urocerus Stephensi* to *stephensi* are less serious practically, as they are concerned only with the terminations, but the same principle is involved. Eight families have now been dealt with in the first seven parts of this work, viz. . . Tiphidae, Cephidae and Syntexidae, Pamphiliidae, Xyelidae, Trigonaloidae, Sirecidae, and Xiphydriidae.

ROBERT B BENSON.

Orthopterorum Catalogus. Editus a M. BEIER. Pars I . R. EBNER. 1938, pp. 70. Dr W. Junk, Den Haag, Holland. Price 5.50 florins.

This part deals with the four subfamilies *Ephippigerinae*, *Pycnogastrinae*, *Bradyporinae* and *Deracanthinae* of the Tettigoniidae. Since no up-to-date published catalogues of Tettigoniidae are available, this and the succeeding parts, which it is to be hoped will be available soon, will be absolutely indispensable to all workers on this group of Orthoptera. First, a catalogue of general works on Tettigoniidae, including works of systematic, faunal and geographic nature and works on the anatomy, physiology, life-history, sexual and other biology, ontogeny and economic relations of the Tettigoniidae in general is given. Following this, each subfamily is treated in turn; first, the works on the complete subfamilies are cited and subsequently each genus is dealt with, and references to the literature on each species and its present known distribution are given. All references are arranged chronologically.

Two indices refer respectively to families, subfamilies, genera and subgenera; and to species, subspecies and varieties. It might be considered desirable to have an index to authors in succeeding parts. The only adverse criticism one can make of this admirable

work is to regret that workers on Orthoptera were not consulted before its publication as to the possibility of imminent publication by them of new work on the groups concerned. Thus, for example, recent descriptions of North African species of *Uromenus* by Chopard and Uvarov and Chapman could have been included, and the catalogue made more up to date. Otherwise it is both excellent and invaluable.

K. H. CHAPMAN.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—February 10th, 1938. —Mr. F. S. Stanley-Smith, President, in the Chair. — Mr. R. J. Collins exhibited aberrant forms of *Ectropis bistortata* from Kingswood, Surrey, 1936-1937, 2nd brood; Mr. G. O. T. Howard, dark examples of the same species, but of a different form; Dr. Bull, a series of aberrations of *Colotois (Himera) pennaria* from Herts, Kent and Sussex, and a dark chocolate-coloured *Omphaloscelis lunosa* (ab. *intensa*) and also ab. *agrotoides*; Mr. Priest, *Dasychira pudibunda*, which emerged on Christmas day; Mr. Dennis, a photograph of the ovum of the wood cricket *Nemobius sylvestris*; Mr. Turner, specimens of *Heliothis dispacea* and of *H. maritima*, which latter had only recently been recognized as being found in this country, and pointed out the distinguishing characters of the two species.

Thursday, February 24th, 1938. —The President in the Chair. —Mr. Hugh Main exhibited two species of fruit flies, *Drosophila funebris* and *D. subobscura*, and remarked on their habits in confinement; Mr. Hawkins, larvae of *Dorcus parallelopipidus* (Col.) taken in a tree stump; Mr. Ashby, specimens of the beetle *Ptinus latro* sent for the collection by Mr. H. Donisthorpe; Dr. K. G. Blair, an example of *Chloroclystis rectangulata* var. *ingrosericiata* from his garden at Hendon and remarked on the curious position of the genitalia, which were fully displayed, Mr. Hy. J. Turner, some species of Pyrales from India collected by Mr. Sevastopulo and made remarks on them. Mr. Finnigan showed a large number of lantern-slides of well-chosen entomological objects and made appropriate remarks.

March 10th, 1938. —The President in the Chair. —It was announced that Mr. F. D. Cook and Mr. E. E. Syms were elected Assistant Secretaries to prepare and place before the Council suggested schemes of Field and Indoor Meetings respectively. The following were elected members: Miss M. Burton, 212, Golder's Green Road; Mr. O. C. Davies, 33, Hopton Road, Streatham; Mr. D. H. Sterling, 91, Calbourne Road, Balham; Mr. F. W. Pollard, St. John's Avenue, Brentwood; Mr. B. P. Beirne, 4, Tobernea Terrace, Monkstown, co. Dublin; Mr. W. Buckley, F.R.E.S., 5, Westfield Road, Cheadle Hulme,

Cheshire. Dr. G. V. Bull exhibited living larvae of *Callimorpha quadripunctaria* from Bovey Tracey, and reported *Eupithecia abbreviata* on March 6th, *Taeniocampa munda*, *Biston strataria* and *Ectopus crepuscularia* on March 9th; Mr. Hy. J. Turner showed living bred male and female *Poecilopsis pomonaria*, another European species nearly related to our Scottish *P. lapponaria*; Mr. M. Niblett, *Trypeta microceras* bred from stems of *Centaurea centaurea*, and gave notes on its history and occurrence, also *T. ceratocera* bred from the flower-heads of *C. scabiosa*; Mr. T. R. Eagles, several species of fungi productive of Coleoptera, and males, females and living larvae of *Dorcus parallelipipedus*; Mr. Ridley (a visitor), a cinematograph film in colour, illustrating the life-history of *Papilio machaon*.

March 24th, 1938. The President in the Chair.—The decease of Mr. Stanley Edwards, an Honorary Member, and of Baron Bouck was reported. Mr. S. N. A. Jacobs exhibited bred examples of a recently described Tineid, *Mnesipatris plicivora*, from co. Dublin; Mr. A. Bliss, a Lasiocampid larva found among grapes from S. Africa, at Covent Garden; Mr. T. R. Eagles, the living larva of *Aplecta nebulosa*; Mr. R. J. Collin, an example of *Chimabache fagella*, with the right wings normal and of the light form, the left fore wing dark and shaped as in the female the hind wing was slightly smaller; Mr. Howard, a larva of *Aplecta tineta* from Esher; Mr. Buckstone, an example of *Nomiades semiargus* given him forty years ago. Mr. L. W. Newman gave a most interesting and amusing account of his entomological experiences of the past forty years.

April 14th, 1938. The President in the Chair.—Mr. T. R. Eagles exhibited larvae of *Noctua triangulum* and of *Ecetria buoliana*; Mr. D. W. Rogffe, Coleoptera taken at the Society's Field Meeting at Bookham Common on April 8th, (Col. Cardew, a varied bred series of *Epione respertaria* (parallelaria); Mr. F. D. Coote, *Erannia* (*Hyberna*) *leucophaea* and *E. (H.) marginaria* from Epsom and Ashted; Mr. S. Wakely, larvae and cases of *Coleophora genistae* from Bookham and a larva of *Pseudoterpnia pruinata* from Broadwater Forest; Dr. G. V. Bull, galls on stems of white jasmin. Dr. Bull also reported the early appearance of the flowers of the Oak, Bugle, Hawthorn, Bluebell and Early Orchid in W. Kent, and also gave a comparative list of dates of appearance this year with the earliest dates he had recorded of a number of Lepidoptera. Mr. H. W. Andrews read a paper on the *Cyrtidae*.

May 28th, 1938. The President in the Chair. Mr. M. Niblett exhibited several species of *Cynipidae*; Mr. Coote, a *Monima* (*Taeniocampa*) *stabilis* in which the left fore wing was of a grey tint and the right side was reddish, from Effingham; Mr. Turner, on behalf of Mr. Sevastopulo, bred examples of the Arctiid, *Diacrisia obliqua* and the form *dahlbergiae*; Mr. F. D. Buck, a sample of cocoa and numbers of a species of Coleopteron found when the tin containing it had been opened for use. Mr. Howard called attention to an early mention of collecting insects at light from a work of Wm. Curtis in 1771, and a reference from the French work by Geoffrey. Mr. Mansbridge exhibited specimens of *Peronea logiana* (*niveana*) and

its form *tripunctata*, and also *Eucosma nitidulanus*, all of which he was presenting to the Society for their reference collection. Mr. de Worms and Mr. Ermis read papers on Insects at Light, and a discussion ensued.—HY. J. TURNER (*Hon. Editor of Proceedings*).

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—*January 5th, 1938.*—This being the Annual Meeting, the following Officers were elected : President, H. N. Michaelis ; Vice-President, H. Kitchin ; Secretary, R. J. Wigelsworth ; Assistant Secretary, L. Nathan ; Treasurer, W. Buckley ; Librarian, J. E. Cope ; and Auditor, Dr. J. Hope. Council : A. E. Tonge, J. I. Alfrey and G. S. Kloet. The retiring President, Mr. R. Tait, gave his Presidential Address on “ The Life History of *Ptychopoda (Acidalia) contiguaria* Hb.” This moth, which is restricted to North Wales in Britain, was figured by Stanton in 1856 from a specimen taken by Weaver, and was bred in 1862 by Greening. In the Penmaenmawr district, where the species is scarcer than formerly, following a great fire on the collecting ground in 1921, the imago is out about July 10th to 15th, and is usually taken at rest on the rocks. The ova are small, of a dirty-white colour, later changing to orange, and are laid on loose strands of fibre, and sometimes on fine grass. The moth lays readily in captivity, the number being about 50 to 60 eggs, which hatch in about 14 days. In captivity the larvae eat *Polygonum aviculare* L., also Chickweed and Heather, but in the wild state they feed mostly on Heather, also on *Cotyledon umbilicus* L., etc., hibernating when still small, and probably pupating about the end of April. Following the address, Mr. W. Buckley had some interesting remarks to make, and showed a photograph of a long series of this species, which illustrated his breeding experiments. Mr. Buckley found that light males and dark females did not pair readily, and when a pairing was obtained, the ova were not fertile. Mr. Buckley also showed Continental specimens of this moth, sent him by the late Dr. Müller of Linz, Austria, and read a communication dealing with the range of the species on the Continent. Mr. L. Nathan showed the following specimens, bred 1937 : *Pieris brassicae* L. from Manchester, and *Monima gracilis* F. from Gatley, Cheshire.

February 2nd, 1938.—Mr. H. N. Michaelis, President, in the Chair.—The following exhibits were shown : G. C. Bartindale, interesting selection of Coleoptera ; Dr. J. Hope, 2 specimens of a remarkable aberration of *Dasychira pudibunda* L. bred from a York female. H. N. Michaelis, aberrations of *Coenonympha pamphilus* L. from Delamere. L. Nathan, *Argynnis selene* Schiff., *Aricia agestis* Schiff., *Dasychira pudibunda* L., and *Procris geryon* Hb., all taken at Colwyn Bay, June, 1937 ; also *Ennomos alniaria* L. bred from Chat Moss, September, 1937.—The members then adjourned to the public galleries of the Manchester Museum to hear Mr. H. Britten give a public lecture on “ Pests ”.—L. NATHAN, *Asst. Hon. Secretary*.

ERRATUM.

Page 80, line 22, for “ 2nd ” read “ 21st ”.

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[No. 903

NOTES ON THE LIFE-HISTORY OF *APLASTA ONONARIA*, FUESS.

BY E. A. COCKAYNE, D.M., F.R.C.P.

MR. A. M. MORLEY kindly sent me, on July 17th, 1937, six eggs of *Aplasta ononaria* laid by a female he took in the Warren at Folkestone, and suggested that I might like to describe the early stages. The larvae proved to be structurally unlike any other Geometrid larva that I have seen, and I am not aware that any detailed description has been published. I found that four eggs had hatched during the journey and the others were infertile. The egg is oval, slightly broader at one end, and has an oval depression on the upper surface. The colour is pale yellowish green and the surface is evenly covered with a fine reticular pattern, but is without obvious sculpturing.

Larva, **first instar**, one or two days old. Short and stumpy with even outline and no intersegmental constrictions, it sits with its back slightly arched and its head tucked away under the first thoracic somite. Head small and black; prothoracic plate appears dark grey owing to blackish markings over most of its surface; anal plate whitish with pale grey markings; legs blackish grey; plate on anal prolegs whitish with grey markings. To the naked eye the larva appears to be yellow, but microscopically there are numerous orange-brown wavy lines running longitudinally with pale yellow ground between some of them and white between others. The pattern from dorsum to venter is as follows: A white dorsal line, an orange-brown one, a white stripe, in which the anterior trapezoidal tubercle lies; between the anterior and posterior trapezoidals are two orange-brown lines nearly in contact just posterior to the anterior trapezoidal, the outer one then curving outwards and broken opposite the posterior trapezoidal. Between the posterior trapezoidal and the suprspiracular are two orange-brown lines and another very broken one external to the suprspiracular. An orange-brown line runs from the anterior border of the somite to the spiracle, where it splits into two and almost surrounds the spiracle. Ventral to the spiracle is a broad white stripe, in which lie the subspiracular and post-spiracular tubercles, and below is an orange-brown line. Both the stripe and line run unbroken for the whole length of the larva. Ventral to them are two lighter orange-brown lines. The ventral surface appears to have a similar pattern,

but I was unable to make a close examination. The ground-colour between each pair of lines running between tubercles is tinged with yellow. The spiracles are black and circular, and the tubercles are black and each is situated on a large pale conical elevation; the setae are colourless, rather long, with a beaded appearance, and terminate in a pear-shaped knob. They are curved and those on the thorax point forwards and those on the abdomen backwards.

Second instar : July 20th.—Shape and attitude as in the first instar. To the naked eye the ground-colour appears dark olive green, but microscopically it is pale green with minute black dots, much more thickly peppered in places so as to form the same pattern as in the first instar. Head small and black, with whitish clypeus (front), pale brown labrum, and simple white setae; legs whitish with black rings at base and joints; prothoracic, anal plate, and plate on anal proleg very pale grey; the anal prolegs have simple setae and four pale brown crochets. The tubercles are black and arise from very large conical elevations, which are whitish with black apices. The setae are fairly long, whitish, with an irregular surface, which appears beaded, with the ends rounded and only slightly thickened. They are curved forwards on the thorax, and for the most part backwards on the abdomen. The chief change in the second instar is the development of numerous snow white short hairs, with cup-shaped extremities, some arising from the setal cones and others from special areas on the skin, which are nearly flat. The general arrangement of these hairs is orderly, though there is slight asymmetry. On the prothorax there are two median setae on each side and one at each end of the plate, all six in line along the anterior border, and there are three cup-hairs on each side in line still nearer to the anterior border, one internal to the first seta, one between it and the second seta, and one between the second and third. Along the posterior border of the plate there are three setal cones and six to eight cup-hairs, one or two on each side internal to the first seta, one between the first and second, and one between the second and third, or outermost cone. In the middle of the plate there are a variable number of cup-hairs, roughly arranged in lines between the two inner and the two middle setal cones of the anterior and posterior rows. There are two setae in front of the prothoracic spiracle, each with cup-hairs on the posterior aspect of their cones, one cup-hair on the next subsegment, two on the next, one of which is in line with the first and the other internal to the line of the spiracles. Posterior to the prothoracic plate there is a pair of subdorsal cup-hairs and on the next subsegment two very small cup-hairs exactly behind the first pair. Behind these are the anterior trapezoidal tubercles, each

with a cup-hair arising from the posterior aspect of its cone, and behind these the posterior trapezoidals, each with a small cup-hair arising from the anterior aspect and a larger one arising from the posterior aspect. Then come the supraspiraculars, each with a small cup-hair on the anterior aspect of the cone pointing forwards and inwards and a large one on the posterior aspect pointing backwards and outwards.

Third instar : July 24th.—Ground-colour fairly dark green, but without obvious pattern. General appearance to the naked eye as in second instar, short and stumpy, with head hidden under prothorax and very hairy. Head small and black with white setae. Thoracic setae pointing forwards, abdominal backwards. Cones very large, with black apices, paler green than ground elsewhere. Legs green. On first changing skin almost the whole surface appears to be covered with pale cones and white cup-hairs, only small areas of skin being visible just in front and behind the cones. The white cup-hairs are much more numerous than in the second instar, though arranged on the same plan, but the cones have, in some cases, as many as five cup-hairs on them, one much longer than the others. There are four on the cone of the anterior and posterior trapezoidals and the subspiraculars, and either four or five on the cones of the postspiraculars. The setae are white, with no expansion at the tip. The spiracles, white in the centre with a circular black rim on the apices of pale green truncated cones.

The largest larva prepared for the third ecdysis on August 4th, and entered the fourth instar on the 5th, being then 7 mm. long, the second entered the fourth instar on August 8th, and the third on August 10th.

Fourth instar. General appearance and attitude as before. In one larva the colour was brownish green, more brown than green, excepting the prolegs, which were green, but in another there was only a slight brown tint at first, though it became completely brown after two days. The larvae, after feeding a little for three or four days, went into hibernation on the stems of the ononis, with which their colour matched well. Head small and black, with scattered white spots, from some of which setae arise; legs pale with brown rings; four large brown crochets on each pair of prolegs. The arrangement of setae and cup-hairs on the prothorax is very like that in the second instar. The skin is covered with minute bosses, many with a tiny black point in the centre. There is less black speckling than in the previous instar and no pattern could be detected. The setae are situated on large cones, which have a dark brown ring at the apex and little bosses on the sides; and are browner in colour than the skin, into which they merge. The setae are long, white, and curved, those on the thorax pointing forwards

and those on the abdomen backwards, and the tip is rounded, but not expanded. The spiracles are very remarkable, being set on the top of a high truncated cone, smaller at the base than a setal cone. The spiracular ring and apical part of the cone are dark brown, and there is a smooth narrow ring round the base of the cone. The white cup-hairs are arranged on a definite plan. There are four subsegments, and on each is a cup-hair or a setal cone forming a longitudinal line from the anterior to the posterior part of the somite. As far as I can see, taking these lines in order from dorsum to venter, they consist of (1) the anterior trapezoidal and three cup-hairs, pointing forwards and inwards, the second being the largest; (2) two cup-hairs, the posterior trapezoidal, and one cup-hair; (3) the supra-spiracular, two cup-hairs, and one very small cup-hair lying a little dorsal to the others; (4) ? one cup-hair, the spiracle and two cup-hairs; (5) the subspiracular, the post-spiracular, ? a small cup-hair, and a small setal cone, these forming a less regular line than the others. Below this level there are no cup-hairs and the setal cones are small, and this gives the appearance of a broad plain band running the whole length of the larva. On the venter there are no cup-hairs, and the setal cones are very small.

As in the third instar the large setal cones have four or even five cup-hairs apicee, one or two of which are much larger than the others. The cup-hairs on the cones and skin vary in length of stalk and in the size and shape of the expanded extremity. In some it is like a sherry-glass in profile, but solid, in others it is laterally compressed and sometimes has a bilobed appearance.

My larvae died during the winter, and I do not know whether they turn green again before the next ecdysis or remain brown for the rest of the fourth instar.

Herr H. E. Lange kindly sent me some larvae from Germany in 1936 and they were nearly full-grown on June 1st. They were rather dark green, with no definite pattern, but the skin was covered with microscopic black specks. The long curved white setae arose from large green cones, and on the cones and skin were numerous white hairs, which did not appear to be arranged in well-defined lines. They were present all over the surface, including the venter and prolegs. Some of the white hairs were longer than others, and only slightly expanded at the tip, others were more like the cup-hairs of the younger larvae, but were smaller in proportion to the size of the larva. The spiracle with a brown ring was at the apex of a green cone. The head was pale green, with black along the upper part of the lobes and with a black line running vertically down between the lobes and dividing to form a black border at each side of the clypeus and labrum. The whole surface of the head was

covered with small smooth bosses. There were eight brown crochets on each pair of prolegs.

Mr. Morley examined his potted plants in April and found only four living larvae, two of which survived and were still very small on May 31st. Early in May two larvae were found wild. They had not fed, and were still brown; but after feeding for a day or two they turned green and one spun a cocoon amongst the leaves just before the end of May and the other about the middle of June. There appears to be only one change of skin after hibernation.

16, Westbourne Street,
W. 2.

TARUCUS TELICANUS (LEP., LYCAENIDAE) IN DORSET.—On Monday morning, June 13th, 1938, I went up to Bloxworth Down, near Bere Regis. It was a sunny morning with some clouds about. There were plenty of Blues out and I caught one and examined it through the net. I vaguely noticed it had stripes on the underside of the wings, so thinking it was a variety of *Polyommatus icarus*, popped it into the killing-bottle. Two days later I came to set this particular specimen, when the great difference of the underside from any British Blue which I had ever seen, arrested my attention; I immediately looked it up in Mr. Frohawk's *British Butterflies* and found it to be, as I thought, *Cosmolyce boeticus*. My specimen seemed to correspond with the illustration of that species, except that mine had not got two spots on the upper side of the hind wing; these I thought had been worn off, since mine was a poor specimen. When I took it to Capt. Riley at the British Museum he identified it for me as a male *Tarucus telicanus*, which is a common African Blue, and I am informed that it is the first recorded specimen caught in the British Isles. The capture was made on the edge of an uncut clover field. The wind on the previous day was north easterly.—MALCOLM C. A. LYELL: Westminster School.

ACHERONTIA ATROPOS L. IN GLOUCESTERSHIRE.—A Death's Head Moth was taken by Mr. Leslie Hyett on the front of a house on the Ermine Park Estate, Blockworth, about two miles outside the boundary of the city of Gloucester and brought to me on June 8th, 1938, only two days later than the anniversary of the previous capture of this species in Gloucester on June 6th, 1932. The captor assured me that the occupiers of the house were afraid to come out until he had secured the specimen in a glass jam bottle, for fear it should sting them. Another specimen of this species was brought to me on June 22nd, having been found dead in a bee-hive by Mr. C. Wells, of Noke Court, Hucclecote, near Gloucester. Its wings are devoid of scales and it had apparently been stung to death by the bees, whose honey I assume it was trying to steal.—C. GRANVILLE CLUTTERBUCK; 23, Heathville Road, Gloucester.

A BROADLAND CALAMITY.

By C. O. HAMMOND, F.R.E.S.

IN February, 1938, Hickling Broad, Horsey Mere, and the linking streams and ditches were completely covered by sea-water through a breach in the sea-wall. The fresh-water fish quick enough to avoid the flood made their way into the Ant and Barton and Sutton Broads, but those unable to escape perished in thousands. Hickling Broad has long been famous as a bird sanctuary, but now all the birds have left, the bittern being the last to go. Much time must lapse before these broads are fresh enough to be restocked with fish and ready for the return of the birds, but what of the position with reference to the aquatic insect life, in particular the Parancuroptera?

After a visit on June 9th, I regret to report that the whole of the rich Dragonfly fauna of Hickling Broad and Horsey Mere has been completely wiped out. These two broads, with the connecting Meadow Dyke, were the stronghold of the rare *Aeshna isosceles* Muller. In these localities and nowhere else, it was common, and one felt that there was little chance of extinction while the insect continued to breed in the peaceful haunts of the sanctuary. Now that the entire colony has gone, one wonders whether in the future there will be enough *isosceles* left in the undamaged areas to start a fresh colony at Hickling, for a S.W. wind would soon take them there. (I saw a solitary male about a quarter of a mile away over the marshes.) It is fortunate that the insect can still be found sparingly along the Ant.

The same cannot be said for *Orthetrum cancellatum* Linnaeus, which was common enough at Hickling, but appeared to be an isolated colony there.

Libellula fulva Muller, too, was common. However, I have no fears about this species, which is very common all along the Ant from Stalham to Barton Broad. On June 8th many dozens were sunning themselves on a hedgerow, and we found three or four flying up every few yards we advanced. The species was not nearly so timid as *L. depressa* and *L. quadrimaculata*, and would allow us to approach within a yard with care.

Libellula quadrimaculata Linnaeus and *Brachytron pratense* Muller, equally abundant, will eventually find their way back from surrounding districts, being common everywhere. *Erythromma najas* Hansemann, still common on the Ant from Wayford Bridge to Barton, where it rests on water-lily leaves, will probably spread east from Sutton Broad.

Coenagrion pulchellum Van der Linden, will have no difficulty in re-establishing itself, for this species is easily the commonest one on the broads, being observed at Stalham from June 4th-9th in tens of thousands, outnumbering *C. puella* by about three to one.

The other common dragonflies previously found at Hickling were *Sympetrum striolatum striolatum* Charpentier, *Lestes sponsa* Hansemann, *Pyrrhosoma nymphula* Sulzer, *Ischnura elegans* Van der Linden, *Coenagrion puella* Linnaeus, and *Enallagma cyathigerum* Charpentier. Of these all but the last will easily recolonize from the surrounding districts, but *E. cyathigerum* appeared to be a local colony.

One cannot leave this subject without reference to *Coenagrion armatum* Charpentier, whose status as a British insect rests upon two localities in the Broad. I have searched for several years in the locality near Hickling, where it was once taken, but have not seen it; but in any case this locality would have suffered the fate of the rest, as the ditch was directly fed from the broad. Neither have I seen the species in its other locality, now almost completely grown over with rushes.

34, Passmore Gardens,
New Southgate, N. 11.

A FURTHER OCCURRENCE OF *ZYGÆNA ACHILLEÆ* E.S.P. IN THE INNER HEBRIDES. Early in June this year an expedition was dispatched from this Department to study the Natural History of the Isle of Muck and its neighbour, Eilean nan Each, or the Island of the Horse. Incidentally, owing to stress of the weather, after a similar experience on Muck, we were compelled to stay two days on the Isle of Eigg. In all cases advantage was taken of the occasion to collect the Insecta as extensively as possible. Amongst the insect material assembled were pupae belonging to the genus *Zygæna*, generally taken from colonies near the sea, but often enough from others as far inland as possible. These pupae were usually found, as in the case of those noted on the Isle of Raasay, attached to rocks or to heather stems. Although the first cocoon of *Zygæna filipendulæ* was only observed in Northumberland on June 18th, in the Hebridean Islands all were spun up in the period June 1st to June 10th, and began to emerge on June 18th. The results are very interesting: From Eigg and Muck all the cocoons have yielded *Z. filipendulæ*, whilst from the Eilean nan Each group I have bred three *Z. filipendulæ* and one *Z. achilleæ*. As will be remembered, I have reported (*Proc. Univ. Phil. Soc.*, 10: 324) *Z. filipendulæ* and *Z. achilleæ* from Raasay, and *Z. filipendulæ* (*Proc. Univ. Durh. Phil. Soc.*, 11: 21) from Rhum. In addition, I can now record the latter species from Kyleakin in the Island of Skye.—J. W. HESLOP HARRISON; Department of Botany (with Genetics), King's College, University of Durham, Newcastle-upon-Tyne.

MIGRATION RECORDS, 1938.

BY CAPT. T. DANNREUTHER, R.N.

THE following notes indicate immigration upon a small scale in the spring of 1938. They are not comparable with those printed in the *Entomologist* since 1933, as observers who volunteer to observe regularly have been furnished with schedule forms to enter the approximate numbers of the more regular migrants seen on sunny days throughout the season, and such schedules are not due to be sent in until November 1st. It is hoped that the schedules will give a better quantitative estimate of the migrants present whilst reserving the fuller details, entered upon record cards, for insects in definite movement and unusual occurrences posted promptly for notifying other recorders.

Up to June 30th some 350 cards have been received from which the following notes have been extracted :

Vanessa cardui : Seen in March at Penzance, Plymbridge, Lyme Regis, Haslemere and Carmarthen. On March 26th, at 9.48 a.m., two worn specimens came in from sea and rested at the Start Lighthouse, afterwards flying north. In June small immigrations were recorded at the North Foreland Lighthouse, Folkestone, Battle and Brighton (dozens at flowers on June 3rd). Total. 230 spring insects recorded.

Vanessa atalanta : Some seen hibernating indoors at Bournemouth in January. None seen coming in from sea, but records were received in March from Tring, Eton, Eastbourne, Haslemere, Swindon, Charlton Kings, Grantham, Isle of Man and Glengarriff (Eire). A male was taken on Bredon Hill (Worcs.) on March 31st. Total. 250 seen.

Colias croceus : Seen at Tregovey, Cornwall, on May 1st, a very early date (compare *Entom.*, 67 : 166. Praa Sands, May 13th, 1934). Single specimens seen at Cambridge on May 28th and Folkestone, June 1st, and, altogether, four dozen were reported before June 7th. At Brighton an immigration of two dozen was recorded on June 9th-10th, and another in which 34 were counted flying N.E. on June 16th. Total seen to June 30th, 150 (as compared with only 9 last year). Species was scarce in France.

Colias hyale : On June 4th a doubtful record was received from Polegate. Three were seen at Rottingdean coming in from sea on June 9th (confirmed by Maj. H. Blackiston). Lt.-Col. N. Elot reported the species common at Davos on June 18th, and at Langres, in east central France, on June 21st, but there *C. croceus* and other migrants were then very scarce.

Pieris brassicae : An immigration was reported from Brighton lasting from May 18th to 22nd, on which latter date the species became prominent at Leicester. At its maximum, 20-30 were in sight at a time in Brighton ; but none before or after these dates (compare *Entom.*, 71 : 61 ; the large westerly migration passed Kolberg in the Baltic on May 15th, 1937).

Pieris rapae : On May 22nd at Reading there was a steady flight to the N.E. all day in a light wind. Some specimens were very worn, 3 or 4 being visible at any time. On May 26th a similar flight was seen at Botley, Hants (W. E. H. Hodson).

Acherontia atropos : On May 22nd a good specimen was found clinging to a door in the Chicken Rock Lighthouse at the extreme south of the Isle of Man (C. F. Butterworth). On June 5th a female was taken on board a trawler off Flamborough Head and sent to Royal Scottish Museum (W. Renton). Press reports of two others, in Gloucestershire in June, not yet confirmed.

Herse convolvuli : No 1938 record before July 8th (N. Devon).

Macroglossum stellatarum : Winter records from Canton Var in the south of France, scheduled by Lt.-Col. N. Eliot, give the following numbers seen : in January, 10 ; February, 33 ; March, 97 ; April, 35 ; May-June, *nil*. In England 37 were reported—3 at Plymouth, March 7th, 1 at Eastbourne, March 22nd. In early June, 20 at Hastings and 2 at Timoleague (Eire).

Plusia gamma : One seen at Exmouth on March 6th. Three came in from sea to the Start Lighthouse at night on March 23rd and went north after resting (this is six weeks before the average date for the last five years). One was taken in the St. Nicholas Light Vessel, off Great Yarmouth, on March 29th. No records for April. On May 14th a small immigration seen at Hastings (H. G. Macleod) and 40 seen at Polegate. By May 16th, the average date of first appearance, they appeared in small numbers at many places up to Beccles. Total insects recorded about 240.

Nomophila noctuella : Scarce, but ten records received.

Plutella maculipennis : Few records, but reported common at Reading, probably locally bred.

Cidaria obstipata Fabr. : A female taken near Southampton, June 5th, in perfect condition (W. Fassnidge). No other records.

Phlogophora meticulosa : On April 18th, at 6 a.m., 2 going south reported from the Sunk Light Vessel, 10 miles off Felixstowe, in a N.N.W. breeze ; temperature 40° F. (C. L. R. Turnor).

Heliothis peltigera : One taken on valerian at Stroud (Glos.) on June 6th (T. B. Fletcher) ; another taken at Hastings at lights, June 12th (H. G. Macleod).

As compared with the spring records of 1937, the present season is noticeable for the very early records of *P. gamma* and

the larger immigration of *C. croceus*. Phenological records in the south show many insects appearing from 7 to 17 days before the average spring dates, perhaps due to a sunny March and generally drier conditions later. At Cavalaire in the south of France *Vanessa cardui* was not seen until May 28th with about a hundred in early June in Hautes Pyrénées; with *V. atalanta*, though present in January, in much smaller numbers. Fresh *C. croceus* were seen at St. Tropez on March 17th and another brood June 1st 3rd in small numbers. *Leucania vitellina* was abundant at Bayonne in early June.

“Windycroft”,
Hastings.

PLUSIA MONETA IN SCOTLAND. On my northward journey to catch the boat for the Hebrides I found that I had a day to spare, and this I utilized to determine as completely as possible the extent of the present northward range of *Plusia moneta* in Scotland. In many districts the insect proved to be exceedingly abundant, and points at which it was observed are: Alloa (Clackmannan), near Stirling (Stirlingshire), Kirriemuir and Glen Clova (Angus), Burrelton, Dunblane, Auchterarder, Perth, Blairgowrie, Dunkeld, Pitlochry, Blair Atholl and Struan (Perthshire) and Dalwhinnie (Invernessshire). It was not detected at Spean Bridge, Fort William and Mallaig (Invernessshire) in spite of careful search; similarly, it was absent from the Islands of Eigg and Muck. On my homeward journey larvae were seen at Jedburgh in Roxburghshire J. W. HESLOP HARRISON.

PERCNOPTILOTA FLUVIATA IN NORTH WALES.—On May 17th, while sitting in my drawing-room at about 11 p.m., a female of the above moth flew in to light. It was in perfectly fresh condition, and looks as though it might have been bred in the district. This capture follows that of another solitary female in my moth-trap last August; is it possible that the exceptionally mild winter may have enabled the species to breed in this district?—J. ANTONY THOMPSON; Rhos School, Colwyn Bay.

ACOSMETIA CALIGINOSA IN THE ISLE OF WIGHT. In August last year I found a spot in the island where the *Serratula* grows fairly freely, so made a special expedition on Saturday last (June 18th) to see if I could turn up this species there. As bad luck would have it, I chose the only thoroughly wet afternoon in many weeks and got a good sousing. However, my hopes were fulfilled and I managed to kick up half a dozen males in two hours of pouring rain, thus proving that the species breeds there. To those who want this species I would add that one female will give them a good series without trouble—provided the food-plant is obtainable, and that no captured specimen is worthy of comparison with the bred ones, so quickly does this delicate insect become worn.—P. A. CARDEW (Col.); 21A, Thornton Hill, Wimbledon, S.W. 19.

BRITISH LEPIDOPTERA COLLECTING, 1937.

By C. G. M. DE WORMS, Ph.D., F.R.E.S.

THE season can be said to have opened with a spell of warm weather in the middle of February. On the 14th of this month in the Ascot area *Hybernia leucophaearia* was very numerous at light in all its forms, together with a fair number of *Phigalia pedaria*. A cold snap quickly set in, bringing a break in collecting till the second week in March. On the 13th *Apocheima hispidaria* made its first appearance in the same district, but it was much scarcer than in most years. The *Taeniocampas* were seen first on the 20th near Chiddingfold, chiefly *T. munda* and *T. incerta*, on the willow bloom which was just starting. I did not return to this part of the country till after Easter, which I once more spent in the North.

I travelled up to Aviemore by train on the night of March 26th, and was joined there on the following day by Messrs. Morley and Peyton. A week earlier there had been a record blizzard, with the result that we were greeted by at least a foot of snow everywhere. Collecting for the first two days was confined to pupa digging, which was not altogether too productive. However, conditions became milder on the Monday, the 29th, and during the afternoon we came across the first *Sprawlers*. We even took one of these that night in almost arctic weather. On the 30th, when the thaw began in earnest, *Brachionycha nubeculosa* was to be found quite freely just emerged on the large birch trunks.

I had to return south that evening, and opened the month of April with a visit to the New Forest on the 3rd. That night Mr. N. G. Wykes and I tried the willow in the Brockenhurst area. Insects were very abundant, mainly *Taeniocampa stabilis*, but *T. munda* was unusually common, producing some exceptionally fine banded forms. Later on, near Lyndhurst, we dislodged a couple of *Lithophane semibrunnea* females from one of the bushes.

I was again in the Chiddingfold neighbourhood on the 5th, but both *Taeniocampa mimosa* and *Aleucis pictaria* were almost absent, only one of the latter coming to the light, which attracted a number of the commoner species, especially *Pachys strataria*. The next night was very warm and I revisited the Ascot district with Mr. Hedges. The willows were once more very well frequented, chiefly by *Panolis pimperda*, *Pachnobia rubricosa* and the usual *Taeniocampas*, but there was no sign of *Orrhodia rubiginosa* this season. On the 7th I made my first trip of the year to Ashford, Kent. Willows were again productive in the local woods, where *Taeniocampa populeti* was unusually plentiful. Besides this insect there were a good many *T. incerta* and *T. munda*. I also beat out a single *Xantholeuca croceago*.

My next journey, on April 10th, took me to the Cotswolds, where Mr. Austen Richardson kindly conducted me to some woods which had yielded several *Xanthia croceago* a few nights earlier. Heavy rain, however, marred our efforts. We were surprised when *H. leucophaearia* appeared at the lamps, a very late date for this species. The following day we went over to the Wye Valley, where *Polygonia c-album* was well on the wing. Returning to Surrey I paid a visit to Boxhill on the 13th, in company with Mr. A. G. B. Russell. Here we found *Lobophora polycommata* just out and easy to spot after dark on the twigs of privet.

A further visit to the New Forest on the 17th yielded a few of the red form of *Taeniacampa gracilis*, but very little else of interest. On April 24th I made yet another journey to Conway in the hope of augmenting my series of *Noctua ashworthii*, but my efforts on the following day met once more with very little success. A diligent search among the tufts of heather on rocks only provided five larvae of this species, three of which finally emerged. Apart from these, *Epunda licheneca* larvae were the only others found by day.

Collecting in the Ascot woods at the end of this month was much more profitable. It turned out to be another good season for *Odontotia carmelita*. Four of this insect appeared at light on the 27th, three more on the 29th and one on the 30th. All arrived between dusk and 9 p.m. Other moths observed on these dates included *Dicranura vinula*, *Notodonta trepida*, *Demas coryli*, *Pheosia dictaeoides*, *Selenia tetralunaria* and *Drymonia chaonia*. From a female of the last species taken at light on the 28th I reared a large brood of larvae.

A third expedition to the New Forest began the next month. On May 1st there were a few Prominents at the lamps in the Lyndhurst area. In this locality I took a very pale example of *Drymonia chaonia*. The next day *Boarmia cinctaria* was quite numerous on Brockenhurst Heath. In the afternoon I travelled over to Sandown in the Isle of Wight, where larvae of *Melitaea cinxia* were very scarce. Another night near Ascot on the 4th provided a few each of *N. trepida*, *D. chaonia*, *Polyplocia ridens* and *Boarmia consonaria*. The subsequent week was very unproductive and I did very little till after my return on the 23rd from my trip to Rannoch (see *Entom.*, 70 : 247).

On my return from Scotland my first outing, on May 29th, was to the Chiddingfold woods once more, but in spite of fine conditions I was amazed at the apparent absence of the commoner butterflies, especially *Argynnis euphrosyne*. I resorted to beating and managed to dislodge several small larvae of *Zephyrus betulae*. The following day I made my way to a locality in the Test Valley, which I had visited in the previous autumn. This time my efforts met with

greater success, as it was not long before I came across a full-fed larva of *Plusia chryson*. I was soon able to spot their whereabouts. The large bites in the leaves of the *Eupatorium* and the almost severed mid-rib soon disclosed the hiding-place of the larvae, which were always sheltering near the top of the plant. In this way I was able to find fourteen in a little less than an hour, chiefly in a spot somewhat away from the water's edge. They pupated within the next four days and the moths emerged during the last week of June.

The next evening, the 31st, I was again in Kent on the Wye downs. At dusk we were surprised to see a few *Scoria lineata* already out. Our sugar was disdained by everything until after 11 o'clock, when two *Pachetra leucophaea* appeared, but shortly after midnight there was quite a flight of this insect to the lights, all in very fresh condition. Four female *Bombyx rubi* were also attracted to the lamps about 10.30 p.m.

June began with a warm spell. On the 5th I revisited the Breck Sand area. *Lithostegia griseata* was well out and again quite plentiful in the daytime. There were also a good many *Heliothis dipsacea* on the wing. I went on to Wicken in the evening, but had an indifferent night, the chief species seen were *Arsilomache albovenosa* and *Melana flammea*. Returning south once more a night on the 7th near Ascot with Mr. Russell James produced for him a good series of *Drymonia trimacula* and plenty of *Boarmia consortaria*.

During the following three weeks I made six journeys to Tilgate Forest. On the first of these, on June 11th, the night was ideal, a very high temperature and a thundery tendency. At dusk, among the alders, *Asthena obliterated* and *Hydriomena impluviata* were very plentiful. Insects came in numbers to the lights after dark, quantities of *Ermimes*, a good many of the commoner Hooktips, also *Drymonia trimacula*, and among the Geometers *Lobophora sexalisata*, *Asthena luteata*, *Semiothisa notata* and *Tephrosia luridata*. A further visit on the 14th yielded another good "bag". On this occasion *Palimpsestis fluctuosa* was just starting to appear in some plenty. It turned out an extremely good year for this insect. Besides many of the species already mentioned, others observed on this night included *Stauropus fagi* (only two), a good flight of *Pachys betularia*, together with several intermediate forms, also several *Xanthorhoe unangulata*. The next evening I tried Netley Heath, near Horsley, and found *Hypena fontis* just out and giving good sport as they flitted off the birch trunks. I also came across a freshly-emerged *Acronycta leporina*.

The following week-end of the 19th I made another expedition to the Cotswolds in company with Mr. A. G. B. Russell. It was surprising to see such a contrast on this occasion to my visit to

this district at the same period in 1936. Whereas the Blues were in great numbers in the previous season, it was difficult this time to see half a dozen on the wing. Both *Lycaena icarus* and *L. bellargus* were almost non-existent. Among the day-flying moths *Lithosia irrorella* was beginning to appear, while *Ino geryon* was nearly over.

At Tilgate again on the 21st and 22nd, and in spite of cool conditions, several *P. fluctuosa* came to light. My next week-end trip took me to Woodwalton Fen, where I had not been for three years. I was joined there by Capt. F. Stanley Smith and Mr. B. Embry. The night started promisingly with a good flight of *Hermnia cribrumalis* just after dark, but a dew soon began and insects failed to appear at the lamps. However, searching of the reeds brought to light a good many *Tapinostola extrema* (concolor) and *Leucania impudens*, while at sugar we saw two *Acronycta leporina* and several *A. megacephala*, together with a few *Caradrina morpheus*.

June 27th was a very warm day. In one of the Huntingdon woods *Mesoleuca bicolorata* was flying in swarms with some *A. albicillata*, *Phibalapteryx tersata* and *Angerona prunaria*. Later that day I paid a short visit to Wicken Fen. About 7 p.m. *Banksia argentula* became very active on the wing and were all in very fresh condition, flying rapidly over the short sedge. I also found a pair of *Macrogaster castaneae* on a reed-stem. That evening I joined some friends in the Breck Sand area in a spot where the *Silene otites* was growing plentifully. Shortly after dark many light-coloured moths began careering over the short herbage. All these turned out to be *Dianthoecia irregularis*, just out. We also obtained some at the Viper's Bugloss flowers, together with the dark form of *Mamestra albicollis* and some fine *Agrotis vestigialis*.

I concluded the month with another visit to Tilgate Forest. This time the weather was once more ideal. *Palimpsestis fluctuosa* was commoner than ever, over thirty coming to the head-lights and lamps. Many other species were taken, including *Stauropus faqi* (two), *Notodonta dromedarius*, *Pheosia dictaeoides*, *Laspeyria flexula*, *Cidaria fulvata*, *Hydriomena impluviata*, *Eupithoecia dodoneata* and many *Boarmia roboraria*.

The second half of the year started with a visit, on July 1st, to the Deal district of Kent in company with Mr. A. G. B. Russell. Our chief objective was *Acridalia ochrata*, which we soon found very abundantly sitting with open wings on grass-stems, thus easily distinguishable from *Mesotype virgata*, which keeps its wings vertical when at rest. There was a good assortment of insects at sugar, *Agrotis ripae*, *A. cortica*, *A. vestigialis* and *Mamestra albicollis*. At light we were surprised to see already *Lithosia pygmaeola*.

My next trip on the 3rd took me to the Essex coast near Harwich. It had been extremely hot and the night promised well, but a strong east wind got up at dusk and spoilt the collecting. Just before dark larvae of *Malacosoma castrensis* were very numerous, while *Acidalia emutaria* was flying everywhere. There was very little at sugar and the only moths on the marram heads were *Agrotis ripae*. The following day I made my way to the Aldeburgh area and an hour's search of a large pine copse yielded five *Hybicus pinastri*, four just emerged.

(To be continued.)

A BLACK VARIETY OF *SALEBRIA HOSTILIS* STEPH.—On June 17th I bred a black variety of this local insect from an Essex larva. So far as I am able to trace this specimen is the first known of this form. I have consulted the British Museum (Natural History) authorities, who cannot find that any such insect has been described from this country or the Continent. I am usually somewhat averse to the description of a variety founded on a single specimen, but as these melanic forms of a species nearly always recur I think this one may reasonably be named, and therefore propose to call it var. *nigrescens*. The moth, which is a male, is entirely of a clear greyish black colour, with the usual markings showing in deeper black. The coloration is practically the same as in *S. fusca* Haw. My thanks are due to the British Museum (Natural History) for kindly looking into the question of a previous description for me. H. C. HUGGINS; 875, London Road, Westcliff-on-Sea.

NEWT ATTACKED BY DRAGONFLY LARVA.—As a partially parallel case to Mr. Buckstone's on p. 128 I can report a young newt, about an inch and a quarter long, seized and killed by a nearly full-grown larva of *Aeshna juncea*. I had reared the newt from an egg found wrapped in leaves of Water Starwort (*Callitriche*) and kept it in a large glass aquarium, with a small piece of thin wood floating on the water for the baby to climb on to when it lost its gills. But my kindness led to its undoing, for the *Aeshna* larva was introduced into the aquarium later, and as it found the wood a very convenient place to lurk under for unwary prey, the newt duly fell an unexpected victim. C. NICHOLSON, Tresillian, Cornwall.

PLUSIA GAMMA IN THE ISLE OF MUCK IN 1938.—On June 1st, while I was collecting orchids in a swampy area on the north coast of Muck, a very worn specimen of *Plusia gamma* flew into the cove and settled near my feet. If it had just come in from the sea, it must have arrived from the north or north-east; on the other hand, it is quite possible that it had reached Muck prior to my arrival and had been flying on the island for some days.—J. W. HESLOP HARRISON.

ON THE TYPES OF *ADELPHA* (LEP., NYMPHALIDAE) IN THE COLLECTION OF THE BRITISH MUSEUM.

BY ARTHUR HALL, F.R.E.S.

THE only complete monograph of the extensive genus *Adelpha* which has ever been attempted is that by Fruhstorfer in Seitz's *Macro-Lepidoptera of the World*. That monograph, which appeared in 1915, contains much useful information accompanied by a number of, for the most part, excellent figures, but there are in the text a considerable number of errors, some of which can only be explained by the assumption that the author was working in a great hurry and had mixed up several of Felder's types.

The recent acquisition by the British Museum (Natural History) of that part of the Fruhstorfer Collection which contains the genus *Adelpha* affords an opportunity to clear up most of these errors from the original material.

Furthermore, the long series of specimens now available for examination in the National Collection as well as in the Tring Museum and in my own collection shows conclusively that several forms which have hitherto been regarded as distinct are dimorphic forms of the same species, and a complete revision of the difficult groups represented by *A. erotia* Hew. and *A. serpa* Bois. respectively will eventually be necessary. As a step towards this desirable end I am indebted to the Trustees of the British Museum for permission to publish the following notes :

Adelpha isis D.

divina Fruhst. is based on two females from Espiritu Santo having an unusual amount of red at the base of the fore wings and probably is only an individual form. As specimens from Santa Catharina and Parana have a slightly narrower red band *pseudagrias* Fruhst. may stand as a weak subspecies, but the type-specimen, with only a small dot in the cell, is an extreme.

A. lara Hew.

There is some slight variation in the width of the red band, but the type of *namas* Fruhst., from Bolivia, agrees very well with Hewitson's type of *lara*, so that the former falls as synonym.

Four specimens from the Oberthür Collection have the band very pale pink, two of them with yellow edges, and suggest a transition to *A. hypsenor* G. & S., whilst three males from Manizales, which are undoubted *hypsenor* in all other respects, also have pinkish bands. It would thus seem that *hypsenor* is nothing but

a white-banded race of *lara*, which it appears to wholly replace in Western Colombia.

As regards *fassli* Fruhst., described from the Cañon del Tolima, I am unable to say anything, as there was no specimen under this name in the Fruhstorfer Collection.

A. melanthe Bates.

A specimen of *melanippe* G. & S. from Popayan has the band of fore wings almost white and seems to indicate another approach towards *A. hypsenor*: it seems as though these three species, *lara*, *hypsenor* and *melanthe* are very closely related.

A. epone Godt.

agilla Fruhst. is a good subspecies: the type is from Colombia. Staudinger's and Seitz's figures of *epone* both represent *agilla*.

A. salmona Hew.

epouna Stgr. is a white-banded race of *salmona*, the absolute identity of the under-surface leaves no doubt on this subject. *volupis* Fruhst. is synonym to *epouna*: the statement in the description that the white band ends at the lower median is not borne out by the type-specimen or other specimens from the Agnaca Valley.

A. mesentina Cram

The normal female only differs from the male in its larger size, but in a very interesting female form from French Guiana the hind wings are crossed by a narrow whitish-yellow band.

A. irma D. & H.

The type of *wilhelmina* Fruhst. from Bolivia agrees very well with that of *fumida* Butl. from Nauta and so sinks.

A. irma Fruhst.

I am unable to find any constant differences between Bolivian specimens and those from Peru, and therefore regard *nadja* Fruhst. as synonym. There is, however, a rather scarce race from Colombia which may be called **enope** subsp. nov. The band of fore wings is narrower than in *irma* with only a feebly marked distal projection in cellule 4 and no trace of the subapical spot. On the underside of the hind wings the bluish white spots at the end of the cell are

reduced, so that the costal spot appears more isolated. Described from one male (type) in the British Museum and one male in my own collection.

A. boreas Butl.

tizonides Fruhst. is synonym to *tizona* Feld. and *verenda* Fruhst. falls to *boreas* Butl., although specimens from Peru are generally larger than those from Bolivia. *opheltes* Fruhst. is a good subspecies, but was not represented in the Fruhstorfer Collection.

A. salmonens Butl.

The type is from Venezuela, not Colombia as stated in Seitz. *emilia* Fruhst., the type of which is from Colombia, is a good subspecies which has the band of fore wings much broader; the underside figured in Seitz as *salmonens* is a female of *emilia*. The Central American race, which I propose to call **salmonides** subsp. nov., agrees with typical *salmonens* in the narrower band of the fore wings, but the underside is of a more rufous tint and the post-discal and submarginal spots of the hind wings are not so well defined. Type in the British Museum from Nicaragua, also one male from Guatemala and one male from Belize in my collection. *A. colada* Feld., the type of which seems to be unique, was treated by Fruhstorfer as a distinct species, but as I possess specimens showing intermediate characters it is probably only another form of *salmonens*. Another interesting form close to *colada* is in the Tring Museum from the Inambari River, Peru.

A. saundersii Hew.

Both Weeks and Fruhstorfer seem to have mistaken *frontina* Hall (*Entomologist*, 1935, **68**: 223) for typical *saundersii*, so that *helepecki* Weeks and *leutha* Fruhst. fall as synonyms to the latter.

A. leucophthalma Latr.

Latreilles type is now in the British Museum. Although rather rubbed, it agrees well with Butler's type of *mephistopheles* and other Colombian specimens. *tegeata* Fruhst. is another absolute synonym, and a specimen from the Rio Aguaca bears one of Fruhstorfer's type labels accompanied by another MS. name, so that it would seem as though that author made his five Colombian specimens into four subspecies! There appears, in fact, to be only one race although specimens from Nicaragua are rather small. The Museum series of 22 males and 16 females contains no specimen from any locality south of Colombia except the type-specimen which was said to be from the west coast of Peru.

A. zina Hew.

The types of *leucacantha* Fruhst. and *restricta* Fruhst. agree well with Hewitson's type of *zina* and equally well with one another, both falling as synonyms; all are from Colombia. The extension of the white patch of hind wings by means of a small spot above the upper radial is an individual character as is shown by the 44 specimens in the Museum Collection. All are from Colombia. In a race from Ecuador, which I propose to call **manetho** subsp. nov., the yellow band of the fore wings is posteriorly narrowed and more excavated between vein 2 and the inner margin, and the white patch of the hind wings is larger and quadrifid. Types, male and female, in the British Museum.

(To be continued.)

NOTES AND OBSERVATIONS.

THE BRIGHT COLLECTION. —For some little time past it has been generally known that Mr. P. M. Bright, of Bournemouth, intended to dispose of some of the butterflies from his well-known collection. On March 8th last some three hundred odd specimens contained in five cabinet drawers came up for sale at Stevens's. This was probably the most remarkable sale of Lepidoptera which has ever taken place at these famous auction-rooms; with the exception of a few typical specimens put in for comparison every insect was an aberrational form. A good many of the specimens offered for sale were in fine condition, but some of the others were not in the first flush of their youth. There was a large attendance at the sale but as far as the writer could judge the actual buyers were few in numbers. It would be neither possible nor desirable to comment on each lot; the writer will merely draw attention to those lots which in his opinion should be mentioned.

The first lot were two *Papilio machaon*, one devoid of blue and the other with an excessive amount of blue in the marginal band of the hind wings. These went for £1 4s. The next two lots were fine bred specimens of *Papilio machaon* var. *niger*, the well-known "black *machaon*"; these realized £16 10s. each—a not unreasonable figure for this rarity. Some years ago the late Percy Richards bred three remarkable specimens of *Pieris brassicae* of a deep pink shade, extreme examples of ab. *carnea* Graham-Smith; these all went into Mr. Bright's collection, and the one offered for sale realized no less than £9; someone evidently wanted a "pink *brassicae*" rather badly. Sixteen ab. *citrona* of *Pieris napi* averaged 11s. 6d. each—a high price considering there are a large number of this form in existence—more than is generally realized. A very pallid but otherwise typical female

napi reached a high figure at £4—more in the writer's opinion than it was worth; the same remark applies to a suffused Irish female of this species at £2 5s. Several extraordinary *Euchloë cardamines* were included in this sale. a fine ab. *flava* realized a high price at £6 6s.; a good ab. *lutescens* was probably worth the £3 10s. it went for; a remarkable male without the black marginal border was cheap at £6 10s.; five gynandromorphic examples went at £2, £2 7s. 6d., £4, £4 10s. and £7 7s., the highest price being given for a good specimen; the others on the whole were poor specimens. A very fine gynandrous *Gonepteryx rhamni* was well worth the £5 10s. it went for; a gynandromorph of this species in good condition realized £7, another went for £2 15s., a hermaphrodite *Colias croceus* in good condition was bought for £4 15s., a male of rather a dull purplish shade was not a bargain at £3, a fine female with the light marginal markings very pronounced was cheap enough at £2, the £2 15s. given for an ab. *obsoleta* of the *helice* form of this species was probably its full value. The fritillarids included amongst their numbers some very striking and remarkable aberrational forms, and, as usual, most of these realized high prices. A fine female heavily suffused with black was not dear at £4 15s., a more extreme example of the same form realized £8, two very fine heavily marked specimens were probably worth the £6 10s. and £9 10s. they went for; two hermaphrodites at £4 5s. and £4 10s. respectively were a good deal less than they generally realize, a fine melanic female was not dear at £8 10s., but in the writer's opinion £16 was too much to give for another similar but perhaps rather finer specimen, a fine female with very large elongated spots was a bargain at £4; a very melanic ab. *valezina* at £13 was quite as much as it was worth. A var. *cleodoxa* of *Argynnis cydippe* (*adippe*) taken at Bournemouth, July, 1877, was cheap enough at £1, and £3 was not too much to give for an example of *cydippe* with very large patches of silver on the underside. A very fine *cydippe* described in the catalogue as "a superb male in fine condition, light wedge-shaped markings round all wings, centre of wings almost black", realized £17—a stiff figure, but probably not too much to give for this remarkable specimen. A very interesting specimen with the fore wings suffused with black was a great bargain at £1 15s.; the writer unfortunately for himself overlooked this particular example, otherwise it would have reached a considerably higher figure; a rather small but very melanic female was not dear at £4 5s. A fine *Argynnis euphrosyne* with entirely black hind wings was cheap at £4; an entirely melanic female realized £9 10s.; a female with heavily blotched wings went for £3 15s., a very interesting male with black hind wings and heavily suffused fore wings was well worth the £5 it was sold for; an underside aberrational form with extra light markings at £6 was probably more than it was worth. A good *Argynnis selene* with the fore wings lightly marked was not dear at £5 10s., but in the writer's opinion £8 was too much to give for another almost similar specimen. An example almost devoid of spots in the centre of the wings went for its full value at £8; the same remark applies to a melanic specimen of this species at the same figure. An underside with large black

patches was cheap at £5, a really striking female aberration in good condition with heavy black bands on all the wings was not dear at £3 10s. A very dark *Melitaea athalia* with the normal markings faintly showing was cheap at £4. The *Euphydryas aurinia*, which incidentally all went to the same buyer, included amongst them three Irish specimens of a peculiar reddish shade, which realized £3 5s.; a female with very pronounced light markings on the fore wings extended into long wedges, an extreme example of a by no means numerous form, realized in the writer's opinion more than it was worth at £4 10s.; this or a very similar specimen was sold for £3 at a recent sale. Fourteen *Lycaena dispar* were for disposal at this sale; the males went at prices ranging from £4 to £6 6s., and the females from £5 to £8 15s., the highest price being given for a very fine female; four other females realized £7 10s. each. A nice female *Melitaea cinxia* with very dark fore wings and light marginal markings was cheap at £5. Two heavily marked *Polygonia c-album* realized £4 5s. each—a good price, £5 was given for a fine female of the rare yellow form. The bargain of the sale was probably a fine male *Nymphalis io* with entirely black eye-spots which was bought for £1 15s.; two examples of the "blind-eye" form went at £3 and £3 5s. respectively, which was not dear. A perfect *Vanessa atalanta* with cream-coloured bands on the fore wings, bred by the late Percy Richards, realized £4; another specimen heavily marked with white at the apex of the fore wings from the Sabine Collection was a bargain at £2 15s. One of the most interesting insects included in this sale was a fine variety of *Vanessa cardui* heavily marked with black on the fore wings and having black wedges and white spots on the hind wings; this specimen was well worth the £12 it went for, considering how rare even minor varieties are of this common butterfly. A specimen of *Aglais urticae* with the costal spots joined realized £5, another of a light reddish ground-colour at £7 10s. in the writer's opinion was not a bargain; another specimen with very dark hind wings and also having the costal spots joined was well worth £4 10s. Two good ab. *obliterata* of *Limenitis camilla* (*sybilla*) at £1 each were cheap enough, and a perfect ab. *nigrina* of this species from the Webb Collection at £3 3s. was a bargain to the buyer; at the Webb sale this specimen realized £6. Two *Apatura iris* ab. *iole* went at £2 2s. and £4 15s. respectively; a poor underside example of this rare form was bought for £1 2s. A pale *Satyrus galathea* in which the normal black markings were replaced by light brown was bought for £5. An interesting specimen was a fine Irish gynandrous *Maniola jurtina* taken by Sabine in Galway; this was cheap enough at £5; the only other Irish gynandrous *jurtina* known to the writer, which was also taken by Sabine in co. Mayo, is in his own collection. A cream-coloured female *jurtina* was sold for £3 5s.; another similar but rather finer specimen went for its full value at £6 6s. Amongst the *Lycaena phlaeas* were a number of very uncommon forms which went at high prices. a female with pale ground-colour in the centre of the fore wings, a striking looking insect, fetched £4; a female with the spotting on the fore wings nearly obsolete went for £2 15s.; another similar but rather finer specimen

was bought for £3 15s. ; two females with the spots on the fore wings radiated went at £3 5s. and £3 15s., an extreme example of the same radiated form realizing in the writer's opinion more than it was worth at £9 10s. ; a specimen of a very unusual orange ground-colour was probably worth the £6 10s. it went for ; another rather similar example was a bargain at £3 15s. An interesting insect was a gynandrous *Adopoea acteon*, a poor specimen, but well worth the £2 it was bought at. A gynandrous *Lycaenopsis argiolus* at £5 5s. was a bargain, a very perfect ab. *obsoleta* of *Aricia agestis* var. *artaxerxes* was not dear at £3 ; a nice male *Polyommatus icarus* of a lavender shade was probably worth the £5 5s. it went at. A gynandrous English *icarus* at £2 5s. was cheap enough, as in the writer's experience English examples are much rarer, though not so striking as Irish ones ; two Irish gynandrous *icarus* went at £4 5s. and £5 each respectively—their full value. The most interesting *icarus* was a gynandromorphic specimen in fine condition which was well worth the £8 it realized. A male *Lysandra bellargus* ab. *cybelli* at £2 was about its usual price ; a fine ab. *nigra* of this butterfly was not a bargain at £10 10s. ; several specimens of this melanic form exist in various collections. Two poor males of the so-called hybrid *bellargus* × *icarus* were bought at £1 2s. and £1 8s. ; a good example of this variety realized £5 10s. ; at the sale of the Massey Collection two good specimens of this rarity realized £7 and £7 10s. respectively ; a nice ab. *radiata* of *bellargus* was not dear at £4 5s. ; another rather finer example of this form at £9 10s. was not a bargain ; a nice ab. *obsoleta* was well worth the £2 5s. it realized.

This was a very interesting and unusual sale of Lepidoptera. On the whole in the writer's opinion the various specimens realized their full value.—W. R.-S.

EPUNDA NIGRA IN HERTFORDSHIRE. I wish to report the capture of a perfect male specimen near Hatfield at light on September 11th, 1937. I think this is the first time it has been recorded for the county.—LAURENCE S. HODSON, Essendon, Herts.

SOCIETIES.

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—*March 2nd, 1938.*
—Mr. H. N. Michaels, President, in the Chair. The following exhibits were shown : H. Britten, seven species of the family *Dryinidae*, a group of small hymenopterous insects, which in the females have a peculiar pincer-like arrangement on the front tarsi. Some species have entirely apterous females, and among the specimens shown was *Gonatopus sepsoides* Westw., taken at Hollingworth, Cheshire, June 1917, by Mr. W. Potter. This is the first specimen of the family to be recorded for Cheshire, and was at the time recorded as a rarer species,

owing to wrong identification. It is only just recently that the original specimen has come to light, and Mr. Britten has been able to correct the identification. T. H. Hanson, specimens of *Polyommatus icarus* Rott. from Arncliffe and Pickering, Yorks, and from Dorset, showing some variation in size and in shade of blue. B. H. Crabtree, a few fine aberrations of *Maniola jurtina* L. from Bexleyheath and Royston. Mr. Crabtree mentioned having bred *Polyphlocia flavicornis* L. on February 28th this year. H. N. Michaelis, Volume XIII of H. T. Stainton's *Natural History of the Tinema*, published in 1873. A paper was to have been given by one of the members, but this had to be abandoned owing to his unavoidable absence on business, and the rest of the evening was taken up in discussing the desirability and scope of a list of insects in the Manchester District.

April 6th, 1938. Mr. H. N. Michaelis, President, in the Chair.—A copy of *Insect Infestation of Stored Products*, by H. Hayhurst, one of the members of the Society, was presented to the Library. Copies of a very interesting booklet, which is a reprint from the Lancashire and Cheshire Entomological Society. *An Entomologist's Holiday in Aberdeen and the Shetland Isle of Unst*, by A. W. Hughes, were distributed to members, and a vote of thanks was passed to Mr. Hughes for his generosity, and to Mr. W. Mansbridge for having kindly sent the booklets in to the Museum. The evening was spent in a Pocket Box Exhibition, and a distribution of duplicates, after which the newly-acquired Longsdon Collection of Papilionidae, and the Sidebotham Collection of British Lepidoptera were inspected. The following exhibits were shown. R. Tait, living larvae of *Ptychopoda contiguaria* Hb.; G. W. R. Bartindale, Coleoptera from the Macclesfield district, J. E. Cope, Coleoptera, T. H. Hanson, melanistic forms of *Ennomos autumnaria* Wernh., and *Selenia bilunaria* Esp. It was decided to hold two Field Meetings during the year, the first on June 25th, to the Goyt Valley, and the second on September 3rd at Delamere. The next indoor meeting will be on October 5th.—*L. NATHAN Asst. Hon. Secretary.*

ENTOMOLOGICAL CLUB. The Verrall Supper Meeting took place at the Holborn Restaurant on January 18th, 1938. The meeting was called for 6.30 p.m., and the usual large attendance thoroughly enjoyed the conversazione which was held in a special room before the supper. Supper was served at 7.30. Mr. H. Willoughby-Ellis in the Chair. Grace was said by the Bishop of St. Edmundsbury and Ipswich, and after the toast of the King and the silent toast to the memory of the Founder (Mr. Verrall) the Chairman announced that 185 acceptances had been received which was hoped to be a record, but several could not attend through illness. He also reminded the gathering of the forthcoming Entomological Congress to be held at Berlin on August 20th, 1938. Invitations were available for any who wished to attend, and he hoped that this country would be well represented. Mr. Collin, the Verrall Supper Member of the Entomological Club, who is always responsible for the arrangements, is to be congratulated on another very successful gathering. The party broke up at a late hour.—*H. WILLOUGHBY-ELLIS (Hon. Sec.).*

RECENT LITERATURE.

Transactions of the Society for British Entomology.

The four parts so far issued of Volume 5 of these *Transactions* consist of three systematic papers and one of an experimental nature. The last concerns the relation of insects, in this case beetles, to the water content of their environment, and the author, G. B. Walsh, concludes, amongst other things, that in the species with which he experimented at any rate, the beetles seemed to possess no power of control of the rate of loss of water; the experiments covered a number of species of beetles from a variety of habitats, and many interesting facts emerged which, unfortunately, cannot be discussed here. Two of the other papers are comparatively short. G. F. Kerrich revises the genus *Hygrocryptus* (Ichneumonidae), and R. B. Benson deals critically with Sawflies of the genus *Empria* in a very able paper. The chief contribution, however, is F. W. Edwards's synopsis of the British short-palped Craneflies. For dipterists this is a paper of major importance; well illustrated and running to 168 pages it provides the first comprehensive account of these insects, such as will enable the collector to identify his catches, on a sound scientific basis. Several new genera and species are described and the introductory remarks are illuminating.

United States Department of Agriculture.

Among publications recently received are the following:

Circular No. 455. *The Toxicity of Haplophyton cinnabidum* A. DC. to *Fruitflies*. Extracts from the stems and leaves of the "cockroach plant" were found effective as a spray.

No. 457. *Mushroom Pests and their Control*. A long list of species is incriminated.

No. 459. *Effectiveness of Imported Insect Enemies of the Satin Moth*. This pamphlet traces the course of events since *Stilpnotra salicis* was first found in New England in 1920. Two parasites which had been introduced in connection with Gipsy Moth control proved valuable, and of those specially imported one (*Apanteles solitarius*) proved its worth in New England and Washington, whereas *Meteorus versicolor* appears to have established itself only in Washington.

No. 464. *The Gipsy and Browntail Moths and their Control*. This supersedes an earlier Bulletin, and summarises existing knowledge.

Farmer's Bulletin No. 1798. *Control of Common White Grubs*. This is a revision of an earlier Bulletin (No. 940) and deals with the control of "cockchafer" larvae (*Phyllophaga*).

Leaflet No. 150. *Carpenter Beetles*. Under this head *Anthrenus scrophularic*, *A. vorax*, *A. verbasci* and *Attagenus piceus* are dealt with. A comprehensive account of control methods which have borne the test of time is given.

N. D. R.

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MICROLEPIDOPTERA FROM IRELAND.

BY BRYAN P. BEIRNE.

THE following is a list of Microlepidoptera collected in Ireland during the last few years. Included are thirty-five species which, as far as I can discover, are new to the Irish list. The occurrences of such local British species as *Stomopteryx sangiella* Stt., *Blastobasis lignea* Wals. and *Pancalia latreillella* Curt. are of particular interest. There are also forty-three species for each of which I can find only single previous Irish records. In these cases the locality from which a species was first recorded is mentioned.

Where a species is already known to occur in a district where I have taken it commonly I have put in the county name only: "co. Dublin" refers only to the southern half of the county, and "co. Wicklow" only to the northern half of Wicklow.

I am greatly indebted to Mr. H. Stringer, of the British Museum (Natural History) for kindly identifying or verifying many species for me.

PYRALIDINA.

Phycitidae. *Pempelia dilutella* Dup.: Seapoint, co. Dublin. *Salebria fusca* Hw.: Seapoint. *Phycita spissicella* Fb.: Powerscourt, co. Wicklow: Killoughrum forest, co. Wexford. *Ephestia elutella* Hb.: Seapoint; *Homoeosoma binaevella* Hb.: Flesk, Killarney; recorded from co. Cork (Barrett). *H. numbella* Z.: Seapoint, common; and Rathmines, co. Dublin. *Cryptoblabes bistriga* Hw.: Glen o' Downs, co. Wicklow. Not previously recorded from Ireland. *Acrobasis consociella* Hb.: Seapoint; Flesk, Muckcross and Cahirnane, Killarney. Recorded from co. Cork (Kane).

Galleriidae. *Meliphora grisella* Fb.: Seapoint, common. *Aphomia sociella* L.: common, Seapoint, Park and Curracloe, co. Wexford; Flesk and upper lake, Killarney.

Crambidae. *Crambus pascuellus* L., *C. pratellus* L. and *C. culmellus* L.: Common, cos. Dublin, Wicklow and Wexford and Killarney district. *C. hortuellus* Hb.: Seapoint and Raheny, co. Dublin; Carton, Maynooth, co. Kildare, Cahirnane, Killarney; Ballyteige, co. Wexford. *C. perlellus* Scop.: Seapoint; Flesk, Killarney. *C. iniquatellus* Schiff: Flesk, Killarney, common. Recorded from Glengariff (Kane). *C. geniculeus* Hw.: Seapoint, common; Greystones, Glen o' Downs and Brittas Bay, co. Wicklow. *C. tristellus* Fb.: cos. Dublin and Wicklow, and Killarney district, common.

Pyraustidae.—*Acentropus niveus* Ol.: Lough Leane at the Kenmare demesne, Killarney, abundant. *Donacula mucronella* Schiff.: Flesk, Killarney. Recorded from Tyrone (Kane). *Cataclysta lemnata* L.: Raheny, co. Dublin. *Nymphula stagnata* Don.: Raheny and Killiney, Dublin; Carton, co. Kildare; Muckcross, Killarney. *Hydrocampa nymphaeata* L.: Raheny, Blessington and Killiney; Flesk and Cahirnane, Killarney; the Quill, co. Wicklow. *Notarcha ruralis* Scop.: co. Dublin, common. *Eurrhypara urticata* L.: co. Dublin and Park, Wexford, common. *Phlyctaenia lutealis* Hb.: Seapoint; co. Wicklow; Killarney district. *P. ferrugalis* Hb.: Seapoint; Newcastle Marsh, co. Wicklow; Curracloe and Killoughrum forest, co. Wexford; Flesk, Ardagh marsh and Cahirnane, Killarney. *P. prunalis* Schiff.: Seapoint; Killarney district. *P. fuscalis* Schiff.: Seapoint, the Quill. *P. sambucalis* Schiff.: Seapoint and Milltown, co. Dublin. *Nomophila noctuella* Schiff.: Seapoint and Glenageary, co. Dublin, Kilmacanogue marsh, co. Wicklow; Park and Curracloe, Wexford; Flesk, Killarney. *Pyrausta purpuralis* L.: Flesk and Cahirnane, Killarney, abundant. *P. cespitalis* Schiff.: Flesk; Greystones, co. Wicklow. *Scoparia crataegella* Hb.: cos. Wicklow and Wexford and Killarney district, very common. *S. cembrae* Z.: Seapoint; Flesk. *S. dubitalis* Hb.: Seapoint. *Evergestis straminealis* Hb.: Flesk, Killarney. *Mesographa forficatalis* L.: Seapoint; Flesk; Curracloe, co. Wexford.

Pyralidae.—*Pyralis farinalis* L.: Flesk, Killarney, common; Seapoint. *Aglossa pinquinalis* L.: Flesk.

Pterophoridae.—*Platyptilia cosmodactyla* Hb.: Seapoint; Glen o' Downs, co. Wicklow. Muckcross and Cahirnane, Killarney. Recorded from Killarney by Birchall; Kane puts it in brackets and says that Birchall's record is "probably referable to the above" (*acanthodactyla*). *P. acanthodactyla* Hb.: Flesk, Killarney. *P. gonodactyla* Schiff.: Seapoint, common; Flesk, King's river, co. Wicklow. *Alucita pentadactyla* L.: Seapoint and Killiney, co. Dublin; Park, Wexford. *Adaina microdactyla* Hw.: Muckcross, Killarney. *Pterophorus monodactylus* L.: Seapoint; Glen o' Downs; Curracloe. *Stenoptilia graphodactyla* Tr.: Seapoint and Ballsbridge, co. Dublin, very common in gardens. I believe it occurs in other parts of Dublin also. Found locally in the south of England. *S. bipunctidactyla* Hw.: Seapoint; Glen o' Downs and Greystones; Flesk and Cahirnane, Killarney.

TORTRICINA.

Phalonidae.—*Phalonia badiana* Hb.: Seapoint; Glen o' Downs. Recorded from W. Ireland (Clare I. survey). *P. emicana* Dbld.: Cahirnane, Killarney. *P. ciliella* Hb.: Seapoint. *P.*

nana Hw.: The Quill. Recorded from Powerscourt (Kane). *P. atricapitana* Stph.: Seapoint. *Chilidonia baumanniana* Schiff.: Newcastle marsh, co. Wicklow. *Euxanthus angusta* Hb.: The Quill; Muckcross and Lough Crincaum, Killarney. *E. straminea* Hw.: Seapoint. *E. zoegana* L.: Seapoint and Raheny, co. Dublin. *E. hamana* L.: Seapoint, Killiney and Raheny; Park, Wexford; Flesk, Killarney.

Tortricidae. — *Batodes angustiorana* Hw.: Seapoint and Killiney; the Quill and the Scalp, co. Wicklow; Killoughrum forest, Wexford; Cahirnane, Killarney. *Capua favillaceana* Hb.: The Quill, Powerscourt and Glen o' Downs. *C. grothana* Fb.: Glen o' Downs. *Cacoecia podana* Sc.: Seapoint; Killoughrum forest. *C. xylosteanus* L.: Killoughrum forest. *C. rosana* L.: Seapoint. *C. sorbiana* Hb.: Glen o' Downs and Devil's Glen, co. Wicklow. Recorded from S. or S.W. Ireland, without locality (Mrs. Lucas). *Pandemis corylana* Fb.: Flesk and Cahirnane, Killarney. *P. ribeana* Hb.: Seapoint and Milltown; Glen o' Downs, Kilmacanogue marsh, Powerscourt and the Quill; Park, Wexford; Flesk and Cahirnane, Killarney. *T. loeflingiana* L.: Seapoint; Killoughrum forest; Glen o' Downs, Powerscourt and the Quill; Killarney district. *T. viridana* L.: Killiney, Glen o' Downs, Powerscourt and the Quill; Carton, co. Kildare; Muckcross, Killarney. *T. paleana* Hb.: Seapoint and Killiney, Greystones, co. Wicklow; Park, Wexford. *T. mburniana* Fb.: Ballyknockan bog, co. Wicklow. *T. rusticana* Tr.: Glen o' Downs, Kilmacanogue marsh, the Quill, Powerscourt and King's River, co. Wicklow. *T. forsterana* Fb.: Seapoint and Rathmines, Greystones; Park and Ferrycarrig, co. Wexford. *T. unifasciana* Fb.: Seapoint; Ardagh marsh and Cahirnane, Killarney. *T. musculana* Hb.: Carrickmines, co. Dublin; Glen o' Downs, Kilmacanogue marsh and the Quill. *Cnephasia osseana* Sc.: Ballyknockan bog. *C. virgaureana* Tr.: cos. Dublin, Wicklow and Wexford; Killarney district; Carton, co. Kildare. *C. chrysanthemana* Dup.: Seapoint. *C. incertana* Tr.: Seapoint. *Olinda ulmana* Hb.: Glen o' Downs and Kilruddery, co. Wicklow. *Argyrotoxa bergmanniana* L.: Seapoint and Killiney; Park and Killoughrum forest; Flesk, Killarney. *A. conwayana* Fb.: cos. Dublin, Wicklow and Wexford; Carton, co. Kildare. Ballygluney, co. Galway. *Peronea holmiana* L.: Seapoint. *P. caudana* Fb.: Kilmacanogue marsh and Newcastle marsh, co. Wicklow; Killarney district. *P. contaminana* Hb.: Seapoint and Killiney; Cahirnane, Killarney. *P. aspersana* Hb.: Seapoint; Cahirnane. *P. ferrugana* Schiff.: Glen o' Downs, Devil's Glen and Powerscourt, co. Wicklow. *P. comariana* Z.: Seapoint; Newcastle marsh and Glen o' Downs; Flesk and Cahirnane; Killoughrum forest, co. Wexford; Kilkee Park, co.

Kildare. *P. latrifasciana* Hw. (*schalleriana* L.): Seapoint; Glen o' Downs, Enniskerry and Powerscourt; Killarney district. *P. logiana* Schiff. (*tristana* Hb.): Cahirnane, Killarney. Recorded from Belfast (Wilkinson). Kane either overlooks or ignores this record. *P. variegana* Schiff.: cos. Dublin and Wicklow; Killarney district; Kilkee Park. *P. mixtana* Hb.: Seapoint. *P. cristana* Fb.: Cahirnane, Killarney. Recorded from co. Cork (Kane). *P. hastiana* L.: Kilmacanogue marsh and Brittas Bay, co. Wicklow. *P. literana* L.: Cahirnane, Killarney.

Eucosmidae.—*Spilonota ocellana* Fb.: Seapoint, very common. Recorded from Sligo (Kane). *Acrolita naevana* Hb.: Seapoint; cos. Wicklow and Wexford; Killarney district. *Ancylis lundana* Fb.: Seapoint and Carrickmines, co. Dublin. *A. mitterbacheriana* Schiff.: the Quill. *Gypsonoma dealbana* Fröl.: Cahirnane and Muckross; the Quill and Glen o' Downs. *Notocelia udmanniana* L.: Seapoint, Rathmines and Killiney; Park, Wexford; Flesk, Killarney. *Eucosma vaccinana* Z.: Seapoint; Glen o' Downs and the Quill. *E. corticana* Hb.: Glen o' Downs, Powerscourt, the Scalp and the Quill; Cappagh Wood, Killarney. *E. trimaculana* Don.: Seapoint and Killiney. *E. nigromaculana* Hw.: Seapoint. *E. cana* Hw.: Seapoint; Flesk and Cahirnane. *E. scopulana* Hw.: Flesk. *E. pflugiana* Hw.: King's River, co. Wicklow; Oilgate, co. Wexford. *C. tripunctana* Fb.: cos. Dublin and Wicklow; Ballygluney, co. Galway. *E. subocellana* Don.: Kilmacanogue marsh and the Quill. *E. penkleriana* F. R.: cos. Wicklow and Wexford; Killarney district. *E. ramella* L.: Glen o' Downs; Killoughrum forest; Killarney district. *E. nissella* Cl.: Newcastle marsh; Killarney district. *E. tetraquetana* Hw.: The Quill and Kilmacanogue marsh. *E. tedella* Cl.: Seapoint, Carton, co. Kildare. *E. solandriana* L.: Seapoint, var. *griseana*; Cahirnane. *E. semifusca* Stph.: Newcastle marsh. *Bactra lanceolana* L.: Seapoint and Killiney; co. Wicklow; Killarney district. *Polychrosis littoralis* Curt.: Seapoint. *Endothemia oblongana* Hw.: Cahirnane, Killarney. Not previously recorded from Ireland. *E. ericetana* Westw.: Seapoint; Park, Wexford. Recorded from co. Cork (Kane). *E. antiquana* Hb.: Seapoint; Flesk. *Argyroplote betuleana* Hw.: Cahirnane. *A. variegana* Hb.: cos. Dublin and Wicklow; Park, Wexford. Var. *nubiferana* Hw.: Seapoint. *A. pruniana* Hb.: cos. Dublin and Wexford. *A. striana* Schiff.: Seapoint. Not previously recorded from Ireland. *A. rivulana* Sc.: Cahirnane, Killarney. *A. lacunana* Dup.: cos. Dublin, Wicklow and Wexford; Killarney district. *A. cespitana* Hb.: Ballyteige, co. Wexford. *A. urticana* Hb.: The Quill and Glen o' Downs. *A. bifasciana* Hw.: Seapoint. Not previously recorded from Ireland. *A. latifasciana* Hw.: Flesk, Killarney. Recorded

from Killarney (Barrett). *A. profundana* Fb.: The Quill; Killohgrum forest. *Pammene argyrana* Hb.: The Quill. Recorded from near Cork (Barrett). *P. rhediella* Cl.: The Quill and Kilmacanogue marsh. *P. populana* Fb.: The Quill, Newcastle marsh and Kilmacanogue marsh. Recorded from Enniskillen (Kane). *P. regiana*: Seapoint and Sandymount, co. Dublin; Newcastle marsh. *Laspeyresia woerberiana* Schiff.: Seapoint. *L. pomonella* L.: Seapoint. [*L. grossana* Hw.: "Probably"—Mr. Stringer; Flesk, Killarney. Not previously recorded from Ireland.] *L. ulicetana* Hw.: cos. Dublin, Wicklow and Wexford; Killarney district. *L. perlepidana* Hw.: Powerscourt, co. Wicklow.

(To be continued)

MIDLAND NATURALISTS' UNION. -Representatives of Natural History Societies in the Midlands meeting in the rooms of the Birmingham Natural History and Philosophical Society on June 18th unanimously decided to form a Midland Naturalists' Union, membership of which is open to Natural History, Archaeological and similar societies in the counties of Monmouth, Hereford, Worcester, Warwick, Leicester, Rutland, Nottingham and Lincoln. It is intended to organize an Annual Congress, several Field Meetings and, in the larger towns, a number of lectures during the winter months. A list of lecturers willing to visit societies, a panel of referees for specimens and information in the various groups of plants and animals and other branches of natural history and archaeology, and a system of lantern-slide exchange among members, are also being organized. It is felt that the Union will facilitate co-operative work among the societies and also bring workers into touch with others in their own branches of the subject. Further information may be obtained from the Hon Secretary, G. BRIAN HINDLE, 55, Newhall St., Birmingham.

EARLY SWARMS OF BEES This extraordinary spring has produced some curious results amongst insects, and certainly as regards bees. As there was no rain or frost locally during March and February, my bees began work about February 14th and they have never stopped since. On April 7th the first swarm emerged and was duly hived. A cursory inspection was made and it was seen that drone cells had been formed, and also another queen cell was seen. On April 14th another swarm came out, and on April 17th yet a third, all three from the same hive! The original hive was then gone through and seven queen cells removed, empty ones, and some with larvae in. And there are still enough bees left to make a good workable quantity for the original hive. All three swarms are doing well. The above sounds like the rapid emergences which one generally associates with the tropics. I must, however, state that my hives are very sheltered, facing south, and sheltered by a high wall behind. —J. B. G. TULLOCH (Brig.-General); Hill Court, Abergavenny, April 24th, 1938.

NATURAL HABITS OF *HYDRIOMENA (PERIZOMA)*
TAENIATA STEPH. (LEP., GEOMETRIDAE).

BY A. E. WRIGHT, F.R.E.S.

DURING the past few years I have had the opportunity of observing this local species in a small wood near my home, where it flies fairly freely. It occurs sparingly in many of the woods about the head of Morecambe Bay in both Lancashire and Westmorland, and inland as far as Witherslack and Windermere, but except in the particular wood mentioned above I have only seen single examples taken. It is usually found in dark secluded places where there is little room to use a net, but occasionally it comes out into small clearings and paths, and there I take it more freely.

H. taeniata was discovered here by the late W. G. Clutten, F.R.E.S. He was walking through the wood and accidentally found a moth in his net. He was quite unaware how or where he had got it, and did not even know that *H. taeniata* occurred there. The following day he brought the moth for me to determine, and I recognized it as being like one I had seen taken in 1921 by the late J. J. Lister, F.R.E.S.

Our dark fuscous form is very unlike the one figured in South's *Moths of the British Isles*, vol. ii, plate 85, which I understand was an Irish specimen and is much redder than ours, with the band narrower than those we usually take here; one would have difficulty in recognizing our much darker forms as the same species.

Mr. Clutten told me where he had taken the moth. I went the following day and beat all foliage within reach, but with no success. I went again at night, and found a few flying naturally. It is a rather small moth, and in flight could be mistaken for a pug or a small *Xanthorhoe didymata*.

It begins to emerge in early July and continues till about the third week of that month. In mid-July it starts to fly about 9.30 p.m. (summer time), and stops abruptly about 9.45. The flight is a very limited one indeed. The males are often seen flying at the height of 10 to 12 ft., over the tops of hazel and other bushes, but the females usually fly very low, just above the surface of the herbage. They have a calmer flight, as though intent on egg-laying. They also appear to be much scarcer than the males; two of this sex is a fair catch in a night. This year (1937) I paid five visits between July 6th and 26th, netting in all 29 moths, only three of them being females. From the three I obtained about 40 eggs.

When taken, the sexes are not easy to determine, the females having slender bodies, and, in my experience, they lay very few

eggs. They are, however, usually larger than the males, with more ample wings, and if the moth is taken flying slowly, only a few inches above the ground, it is more than likely to be of this sex.

It is almost impossible to capture *taeniata* in good condition. I conclude that this must be due to the tight manner in which they fold their wings. When in the net one can immediately recognize them, as they invariably sit with their wings tightly folded over their backs, with three-quarters of the upper surfaces closely appressed. I am of the opinion that the wings are loosely scaled, so that any friction caused by movement will displace some of the scales. Moreover I suspect that, on emergence, in the usually damp surroundings, the scales do not dry and harden properly, and that by such close contact they will adhere to the opposite wing and, thus loosened, will be lost in the first flight. This would account for their generally poor condition so soon after emergence. Mr. Littlewood states that even in bred specimens it is difficult to set them without showing marks of needle or brace.

When I reach home I empty my boxes into a glass cylinder containing a spray of birch or privet for the moths to rest on. The females, when laying, do not attach their ova to any plant, but, I suspect, scatter them in flight. I usually find the eggs loose in the bottom of the cylinder and no more than a few each day. The females often live for several days, but the males cannot stand confinement. They invariably die during the night or the following day. Any that are decent can be picked out and set.

I have only very occasionally taken the moth by beating, and then have only found it in trees of dense foliage, such as yew and holly, but the most favoured resting-place of all is among tall straggling gorse bushes. Unless one is alert, and secures them at once, they fly away to some other dark spot.

Since I first took the moth I have also paid frequent visits to the locality in April and May, to look for the larvae after hibernation, but with no success. There is little undergrowth under the shade of the bushes, beyond a few species of mosses. The most common kind is one with a fern-like leaf. This carpets most of the wood and must, I think, be the natural food.

The larvae hibernate in an early stage and when fully grown are rather slender. This year, having seen a full-grown larva which Mr. Littlewood kindly sent me, and which he had reared indoors, I knew exactly what to look for. I went on April 26th and spent some hours in the wood, searching the moss, and again after dusk I diligently searched with the aid of a lamp, but still could not find any larvae; neither did I see any nibbled leaves, or frass. The method of laying adopted by the female, viz. dropping her eggs, seems to suggest the larva being a general feeder. This supposition

is to some extent borne out by the variety of foods Mr. Littlewood and I have found it to partake of in confinement. Most of these are substitutes and do not occur in the wood.

There is a period of about three weeks before the ova hatch out. Eggs secured July 24th and 25th, 1932, hatched on August 12th and 13th, this being the usual period. Cooler weather at this time of year would no doubt retard the hatching for a few days. The conditions in the wood are, owing to the thick cover, definitely moist, and the ova in confinement seem to fare better if placed on damp moss. Mr. Littlewood confirms this, and thinks that without this moisture few would hatch at all. For some years I have sent the ova obtained to Mr. Littlewood, and he will give a full account of his attempts at breeding this delicate moth.

The only variation in *H. taenata* I have noted in our district is in the width of the central band. In some cases it is very wide and strong, in others much narrower; in two specimens I possess it is almost obsolete, being broken up into a number of fine lines. The moth also varies considerably in size: *males* from 21.5 mm. to 18 mm., the majority being about 20 mm.; *females* from 24 mm. to 22 mm.

Brunleigh,
Grange-over-Sands,
N. Lancs.;
December 30th, 1937.

MANX LEPIDOPTERA.- I am collecting particulars with regard to the occurrence and distribution of the Manx butterflies and moths, with a view to the publication of a Catalogue of Manx Lepidoptera. Any records or unpublished notes will be welcome, especially with regard to the Microlepidoptera. Any information will, of course, be acknowledged.—W. S. COWIN; "Kenwood" Brunswick Road, Douglas, Isle of Man.

PYRALIS GLAUCINALIS. -With reference to Mr. Wynne's note on this insect in the *Entomologist*, 71:128, it may be of interest to record that I have found *P. glaucinalis* wherever I have collected in England. It undoubtedly feeds on any dryish decaying vegetation. I have bred it from birds' nests, heaps of dried hedge-trimmings, and chaff. I think it is usually overlooked on account of its somewhat sluggish habits in the daytime, as most of the specimens I have seen have been taken at light. On one occasion, however, about twelve years ago, I found literally hundreds flying in the evening round the remains of a two-year-old red clover stack in a field near Faversham. These were mostly in magnificent condition, having the beautiful coppery gloss which so soon fades after the insect flies. -H. C. HUGGINS.

BRITISH LEPIDOPTERA COLLECTING, 1937.

By C. G. M. DE WORMS, Ph.D., F.R.E.S.

(Concluded from p. 183)

On July 8th I began my main summer holiday, consisting of, on the whole, a successful tour of the British Isles. I spent that night in the Portsmouth neighbourhood, where again I found *Leucania turca* the commonest insect at sugar. Earlier in the day I had visited a number of woods in the vicinity and found butterflies very scarce, especially *Lymanitis camilla*, *Argynnis paphia* and *Aphantopus hyperantus*. The next day I crossed to the Isle of Wight, visiting Parkhurst Forest in the evening. The chief insects seen were *Lithosia mesomella*, *Petilampa arcuosa* and *Hypona albistrigalis*. On the 10th, near Freshwater, *Argynnis aglaia* was flying quite plentifully. Returning to the mainland that afternoon I had some quite good collecting after dark in the New Forest (Rhinefields Enclosure). Insects which came well to light included *Lithosia quadra*, *L. deplana*, *Laspeyria fletcheri*, *Cleora jubata*, *Thera variata*, *Boarmia repandata* and *B. roboraria*. In this part of the forest, too, there was a noticeable absence of butterflies. However, they were more numerous in the Swanage area which I reached on July 11th. *Plebeus argus* was well out on the heaths and *Agapetes galatea* in plenty on the downs. That night I tried light with Messrs. Russell and Morley on one of the local heaths. There had been some heavy rain and soon after dusk quantities of larvae of *Saturnia pavonia* were seen feeding. Later on we came across about twenty *Coscinia cribrum* (both sexes) at rest here and there on the tips of heather, while *Pachynemius hippocastanaria* came very freely to the lamps, with swarms of *Agrotis strigula*. The next day, the 12th, was very wet. Mr. Morley and I spent a very weary afternoon looking for *Hyloteilus pinnatus*, only securing one in two hours. In the evening we motored to Portland. At dusk we took several *Acidalia degeneraria*, but on the whole the night was disappointing. We only obtained one *Agrotis lucerneae* and three *A. lunigera* at flower-heads, while just as we were leaving Mr. Morley netted a single *Acidalia rusticata*. On the 13th, a glorious day, *Plebeus argus* was in good numbers on the Dorset heaths, together with a sprinkling of *Heliothis maritima*, as usual very hard to catch. That night turned out to be one of the best of the year. We selected the same heath locality as on the 11th. This time *Coscinia cribrum* came in a steady stream to light from midnight to 2 a.m. We recorded nearly thirty in excellent condition. About 1 a.m. there was a flight of the small Dorset form of *Macrogaster castaneae* from a nearby marsh. Other species included a

single female *Dasychira fascelina*, four *Gastropacha quercifolia*, *Nudaria senex*, *Hyphenia turfosalis*, *Cochlidia limacodes* and many Geometers.

On the 13th I motored to the Cotswolds, where Mr. Austen Richardson and I had some profitable collecting that night near Cirencester. Almost the commonest insect at light was *Boarmia abietaria*, of which we saw nineteen. There were also several *Palimpsestis duplaris*, *Nudaria mundana*, and among the Geometers *Mesoleuca procellata*, *Bapta adustata*, *Perizoma bifasciata* and *Phibalapteryx tersata*. Later on, near Minchinhampton, we took a few *Asthena blomeri* at the lights. The 15th was a blank owing to a heavy downpour. The next day I travelled up to North Wales in very fine weather, but it became very cold after dark in the mountains and no interesting insects were forthcoming. On the 17th I took in the neighbourhood series of the small local forms of *Eumenis semele* and *Plebeus argus*, the latter getting already over. In the evening I made my way to Witherslack, where another excellent night awaited me. Meathop Moss was well illuminated by my lamp and car head-lights. Moths began arriving to both in great numbers, just over fifty species being observed up to 3 a.m. The Prominents were well represented, including ten *Pheosia dictaeoides*, several *Notodonta cizeac* and *N. dromedarius*. Among other visitors there were a dozen of the dark form of *Palimpsestis duplaris*, a good many *Drepana falcataria*, *D. lacertinaria*, several *Noctua ditrapezium*, *Mamestra persicariae*, *Geometra papilionaria*, *Scotosia undulata*, *Cidaria fulvata*, *Pelurga comitata* and *Selulosema ericetaria*. The following evening I visited Dr. Lowther at Grange. I spent the dusking period in a spot surrounded by plenty of yew and holly, and managed to secure a single example of *Perizoma tueniata*. Later on there was a good response to the lights at Dr. Lowther's house, again over fifty species being observed, many the same as on the previous occasion, but with the addition of *Venusia cambrica* and several more *Noctua ditrapezium*.

I left the Lake District on July 19th and made my way north once more to Rannoch, where I spent a very profitable week. That evening, *en route*, I called on Mr. Poore at Coshieville, where he very kindly let me do some dusking in his garden. The numbers and variety of *Plusias* were remarkable. I took some very nice examples of *P. iota*, *P. pulchrina*, *P. festucae*, *P. chrysitis* in plenty, and we were surprised also to find *P. interrogationis* flying over the *Silenc*, which seemed the great attraction. *P. bractea*, however, was not forthcoming. On the 20th at Rannoch my first objective was *Laurentia flavicinctata*, which I found just appearing in one of the local quarries, where they would sit on the rocks and fly off at the least approach, but as a rule they seemed easier to catch and

less skittish than *L. caesiata*, which they closely resemble. Each night produced some interesting insects. The first, in company with Mr. R. Crewdson, was spent in the direction of Struan. At light we saw three *Gnophos myrtillata*, while at rest we found a good many *Perizoma minorata*, *Xanthorhoë munitata* and three *Trichiura crataegi*, which appears always at this time of the year in Scotland. During the next three days I paid daily visits to the Black Wood, where *Lygris populata* was well out and in swarms, with a good proportion of the brown forms. *Thamnonoma brunneata* was also still on the wing, with the females in very good condition. *Cidaria truncata* and *C. immanata* were equally common. The nights of July 21st and 23rd provided some very good collecting on one of the moorlands to the west of Rannoch. On the first occasion the commonest insect at light was *Gnophos myrtillata*, mostly quite fresh. On the second visit sugar was the better attraction. There were some fine *Eurois occulta*, *Aplecta prasina*, black *Xylophasia monoglypha*, also *A. nebulosa*, many *Noctua augur*, *N. baja* and several *Stilbia anomala*. On the evening of the 24th I again went over to Mr. Poore's and secured some more *Plusias*. On the return journey at sugar I secured one *Mamestra furva*, several *M. gemma*, *Aplecta prasina*, *Noctua baja* and *N. brunnea*.

Leaving Rannoch on July 26th I proceeded to Aviemore and tried sugar and light that evening among the small birches, but there was very little at either. However, while I was dusking, a very fresh *Noctua sobrina* found its way into my net. The following day, the 26th, I set out on a tour of the Western Highlands, motoring via Inverness to Loch Maree, and on by a very wild and precipitous coastal road to near Ullapool, where I put up the night and attempted some collecting, but not much was forthcoming except some *Xanthorhoë munitata* at dusk. This region of Scotland has been little worked and offers great possibilities. The next morning took me south once again. On the way I visited Glen Affric, a remarkable beauty spot. Near the lake on a bank covered with bilberry *Thamnonoma brunneata* was flying in numbers. There were even a good many *Coenonympha tullia* f. *scotica* on a nearby moss, while *Argynnis aglaia* was to be seen everywhere. Returning to Aviemore that evening I tried light among the junipers near the Spey and found *Thera cognata* very numerous, but already getting over. Ten days earlier would have been a better date. The 28th I spent among the small birches and obtained a fine lot of larvae of *Endromis versicolor* just full-fed. On the wing I took *Coenonympha tullia*, *C. pamphilus*, *Polyommatus icarus*, *Plusia interrogationis*, *Perizoma minorata* and *Thamnonoma brunneata*. Sugar was better patronized that night. Two more *Noctua sobrina*

turned up, together with some *N. augur* and plenty of *N. baja* and a few *Orthosia suspecta*.

I went southwards once more on the 29th, reaching Witherslack too late to do any collecting. The following morning I re-visited Arnside in glorious weather. *Erebia aethiops* was just out and flying in great profusion. *Argynnis cydippe* and *Eumenis semele* were also much in evidence, while on the slopes in the early afternoon I netted several *Miana captivuncula*. Later that day I made my way to York, in the neighbourhood of which I attempted some night collecting, but a heavy mist came up and the only visitors to the sheet were *Pheosia dictaeoides* and *Geometra papilionaria*. There was no sign of *Epione parallelaria*. On July 31st I left the North and travelled direct to the Norfolk Broads, where I joined Mr. Archibald Russell and his son, who had already spent a very successful week there. That evening, in their company, I once more visited the marshes near Horning. My friends had taken a few days previously a good number of *Leucania brevilinea*, and on this occasion they were very plentiful from 9.30 p.m. onwards, flitting rapidly over the short reeds. We secured over twenty with a good proportion of f. *sinelinea*. Not much came to light except one *Plastenis retusa*.

August opened with some very fine weather and we spent the 1st on the edge of Barton Broad. Larvae of *Papilio machaon* were again numerous, as were also those of *Earias chlorana*, but there was very little on the wing. We were in the same locality after dark. *Celaena haworthi* was very numerous, flying over the cotton grass just at dusk, but as there did not appear to be much else about in this spot, we migrated about midnight to the sandhills near Waxham. As soon as we set up our lamps *Tapinostola elymi* arrived in a steady stream, but unfortunately the majority were worn. Towards 2 a.m. there was a remarkable flight of *Arctia caju*, nearly forty coming to light, including some very well-marked forms. Among other visitors were several *Smerinthus populi* and many of the commoner Noctuids. This concluded my tour and I returned home on August 2nd. On the way I again found *Anticlea berberata* well out on the Suffolk border, and easily dislodged by day from the bushes of its food-plant. The rest of the month was extremely disappointing, in spite of favourable weather conditions. On August 8th I was in the Ashford woods, but only comparatively few larvae of *Diptera orion* and *Cucullia asteris* were forthcoming. On the 11th I revisited the Chilterns and on this occasion found larvae of *Cucullia lychnitis* extremely abundant on the black mullein. They were in all stages from just hatched to full-fed. Some *Lophopteryx cuculla* were again to be beaten from maples in the neighbourhood.

I did not carry out any further profitable collecting till the end of the month, when I was once more on the Dorset coast near Swanage. On the 28th butterflies were still plentiful in the vicinity, chiefly *Lysandra coridon*, *Lycaena astrarche* and *Thymelicus actaeon*. On my return journey the following evening I halted near Pickett Post in the New Forest and took at the head-lights seven fresh examples of *Agrotis agathina*, several *Noctua castanea*, two *Stilbia anomala* and a single *Cirrhodia xerampelina*.

For the first fortnight of September I made my headquarters at Ashford, Kent, spending the daytime in London and working the district each night. During the earlier part of this period *C. xerampelina* was quite numerous at light near Wye. On the 8th we recorded nearly twenty. *Ennomos fuscantaria* put in a frequent appearance, together with swarms of *Epineuronia popularis*. I was at Dungeness on the 2nd, 6th and 12th, but there were only a few common Noctuids at sugar. *Bombyx trifolii* was still fresh on the second visit. On the 13th larvae of *Lobophora viretata* were very common on ivy and just full-grown. That night I tried Sandwich and found *Aporophylla australis* starting to appear. Also on the sugar were several *Calocampa vetusta* and *Agrotis saucia*. On the 16th I made a trip to the Essex coast and took a few *A. lutulenta* at sugar. I was once more in the Breck Sand area on the 26th; *Mellinia ocellaris* was not so common, in fact all members of the Sallow family seemed very scarce this year. The autumn, as a whole, was very disappointing, all the usual species being very meagre in numbers. *Lithophane sembrunnea*, however, was much in evidence. Several appeared at sugar here in the first week of October. On the 9th I made a final trip to Swanage. Near Lulworth that night, with Mr. A. G. B. Russell, I secured a very fresh *Dasypolia templi* at light and several *Epunda lichenea*. The next day, which was very warm, there were many Pierids on the wing, as well as *Vanessa cardui* and *Vanessa atalanta* and *Polygonia c-album*. The week-end of the 16th saw me again in the Cotswolds, where, near Cirencester there were a good many insects at ivy, including *L. sembrunnea*, *Xanthia aurago*, *Amathes macilenta* and some fine black *Miselia oryacanthae*. From my last outing, to Kent on November 7th, I returned with a good "bag" of *Ptilophora plumigera* (as described in this vol.—Entom., 71: 42).

In conclusion 1937 may be considered on the whole a very poor season. The extremely wet winter was probably the chief factor in making it one of the worst on record for many species of butterflies. Most migrants were very scarce, while hardly any rare visitors were noted. The most outstanding capture of the year was doubtless several *Aplastis ononaria*.

Milton Park, Egham;
March, 1938.

THE NAMES OF SOME MALLOPHAGEN GENERA.

BY THERESA CLAY.

RECENTLY Dr. Kéler has attempted to re-introduce into the nomenclature certain generic names of Mallophaga. This note has been prepared with the object of preventing the confusion which may arise if Dr. Kéler's proposals as to these names are accepted. The names in question are: *Nirmus*, *Physostomum*, *Liotheum*, *Colpocephalum* and *Docophorus*, all of which were published by Nitzsch in 1818.

Neumann (1906) has shown that *Nirmus* Hermann 1804 is a synonym of *Ricinus* de Geer and invalidates *Nirmus* Nitzsch, which is thus preoccupied and was therefore renamed *Degeeriella* by Neumann. Dr. Kéler has therefore no grounds for reinstating *Nirmus* Nitzsch in place of *Degeeriella* Neumann.

Neumann (1906) designated as genotype of *Ricinus* the species *R. fringillae* de Geer, which is conspecific with *irascens* Nitzsch (1818, *nom. nud.*, described by Burmeister, 1838). This latter species was included by Nitzsch in his subgenus *Physostomum*, together with two other congeneric species; thus *Physostomum* Nitzsch, as Neumann (1906) has pointed out, is synonymous with *Ricinus* de Geer, and cannot be used in the place of this latter genus as Dr. Kéler (1936) proposes. The status of both these genera has already been considered fully by Neumann (1906) and Johnston and Harrison (1911).

Liotheum Nitzsch was considered to be a synonym of *Ricinus* de Geer by Johnston and Harrison (1911), due to the fact that in Nitzsch's original paper, 1818, the species *irascens* (synonymous with *fringillae*, genotype of *Ricinus*) was listed under the generic name *Liotheum* within the genus *Physostomum*. This fact, however, does not invalidate *Liotheum*, which must be used for *Liotheum zebra*, the genotype designated by Neumann, 1906. Since Johnston and Harrison (1911) considered *zebra* to be the type of *Colpocephalum*, this latter genus must become a synonym of *Liotheum*, which is unfortunate, as it entails the suppression of a well-established name in the place of one which has scarcely been used since Nitzsch's original paper in 1818.

Philopterus Nitzsch was originally described as a genus containing four subgenera, the first mentioned of which was *Docophorus*. Neumann (1906) designated as genotype of *Philopterus* the first described species, *i. e.* *ocellatus* Scopoli, under the first-mentioned subgenus, *Docophorus*, and considered that the name *Philopterus* should replace that of *Docophorus*, as in the elevation of the subgenera of *Philopterus* to generic rank the original genus *Philopterus*

had not been retained. This fact, however, does not invalidate *Docophorus*, which can be used for any of the species originally included in this subgenus by Nitzsch. The revival of the name *Docophorus* would in no way simplify the nomenclature and would probably lead to confusion. Therefore the species *Philopterus* (*Docophorus*) *ocellatus* Scopoli (genotype of *Philopterus*) is here designated as genotype of *Docophorus*, thus sinking this latter genus as a synonym of *Philopterus*.

I am much indebted to Dr. Jordan for much valuable advice on this matter.

REFERENCES.

- NITZSCH (1818). —*German's Mag. d. Entom.*, 3 : 261 sqq.
 NEUMANN (1906). —*Bull. Soc. Zool. France*, 31 : 54 sqq.
 JOHNSTON and HARRISON (1911). —*Proc. Linn. Soc. of New South Wales*, pt 2, 36 : 321 sqq.
 KÉLER (1936). —*Bull. Ent. Pologne*, 14 15 : 313 sqq.

WHAT DETERMINES LARVAL CHOICE OF FOOD-PLANTS ? —Why is it that a brood of larvae of a normally polyphagous species will select one plant to feed on to the exclusion of all others, whether allied or non-allied, that may be offered ? Are there any data to show whether such choice depends on the plant on which the parent moth or butterfly fed ? The normal food-plants of *Smerinthus ocellata* in Britain are presumably willow, aspen, apple and pear, in that order of preference in a wild state. But a score of eggs, laid naturally on rose and sent to me from Lostwithiel, Cornwall, on June 6th, hatched on the 14th, and although the larvae were offered willow, aspen and apple (all of which grow in the garden) they unanimously selected aspen, on which they have fed steadily, and are now just an inch long and passing through their third ecdysis. Another batch of larvae from eggs laid on wood at Enfield, Middlesex, on June 20th have also selected aspen in most cases, but a few are feeding on willow. Is there any justification for thinking that the parents of the first batch both fed up on aspen, or some other poplar, and that one parent of the second batch had also fed on poplar whilst the other had fed on willow ? No doubt rearers of Lepidoptera have met with many similar cases of apparently arbitrary selection, and it would be interesting to hear of notable instances, especially if data have been kept of the chosen food-plants of successive generations.—C. NICHOLSON ; Tresillian, Truro, Cornwall, June 30th, 1938.

LEVERHULME RESEARCH FELLOWSHIPS.—Amongst the recipients of fellowships recently awarded, readers will be pleased to note that there is one entomologist, namely Dr. W. H. Thorpe. The award is for research in the physiology of tropical African Homoptera.—N. D. R.

ON THE TYPES OF *ADELPHA* (LEP., NYMPHALIDAE) IN THE COLLECTION OF THE BRITISH MUSEUM.

BY ARTHUR HALL, F.R.E.S.

(Continued from p 187)

A. justina Feld.

justinella Fruhst. is a very good subspecies, but the type of *praevalida* Fruhst. agrees so well with certain Colombian specimens that I doubt whether the name can stand or whether, indeed, the locality "Cuzco" is correct. A specimen from the Oberthür Collection probably represents the true Peruvian race, which may be called *nicetas* subsp. nov. The band of the fore wings is deeper yellow, posteriorly wider, its last spot almost as large as the preceding one and there is only one subapical spot; the white patch of the hind wings is reduced to a slender band. Underside more rufous-brown, the last two spots of the band of fore wings divided by a brown line, the white band of hind wings narrower and of uniform width, continuous with the costal spot. Type, one male from Chanchamayo in the British Museum. The figure of *justina* in Seitz is so bad as to be unrecognizable.

A. olynthia Feld.

levicula Fruhst., *olynthina* Fruhst. and *theaena* Fruhst. seem to be good species, but *zopyra* Fruhst. is synonym to *olynthina*.

A. valentina Fruhst.

The four specimens in the Fruhstorfer Collection were labelled as types of four different subspecies, viz. *valentina* Fruhst. from the Rio Negro, *ophidusa* Fruhst. from Ecuador, *ozolis* Fruhst. from Peru and *thyrea* Fruhst. from Bolivia. As these show no tangible differences it is fortunate that the last three names do not appear to have been published.

A. alala Hew.

The eleven names given in Seitz represent at the most four good subspecies, several of which, however, have two individual forms according to whether the discal macular yellow band of the fore wings is confined to the apical half of the wing or is continued to the inner margin; these may be briefly called the short-banded and long-banded forms respectively. Typical *alala* Hew. is the short-banded form of the Venezuelan race; the long-banded form is *titia* Fruhst., this having frequently a yellow band on the

hind wings also. In Colombia and on the Rio Negro the short-banded form is *negra* Feld., to which *precaria* Fruhst. is synonym; the long-banded form is *completa* Fruhst., this also having frequently a yellow discal band on the hind wings, but the unusually pale underside of the type of *completa* is an individual character. I have not seen the type of *ehrharti* Neuenb. from Ecuador, but most specimens from that country approach close to *negra*, with a slight tendency to revert to typical *alala*. In Peru and Bolivia the short-banded form is *negrina* Fruhst. and the long-banded one *cora* Fruhst., the latter without a yellow band on hind wings. *albifida* Fruhst., the type of which bears no locality, is an aberration resembling *negrina*, but with the subapical spots of fore wings white instead of yellow, whilst *privigra* Fruhst., type from Peru, only differs from *albifida* in the narrower white median bands. There also occur specimens in which the subapical yellow spots are obsolete or are bordered proximally by white dots. Lastly, *fillo* Fruhst., with type from Argentina, but represented also by an exactly similar specimen from Yungas de la Paz, only differs from *negrina* in its narrower white median bands.

A. corcyra Hew.

aretina Fruhst. is a very good subspecies from Ecuador and parts of Colombia, but the four specimens in the Frustorfer Collection which correspond to the description were all labelled *collina*, whilst a specimen of typical *corcyra* bears one of Frustorfer's type-labels, which was presumably put on by mistake instead of on the type of *aretina*.

A. collina Hew.

epidamna Feld., which Frustorfer treated as a separate species, is synonym to *collina*. It is by no means so rare as the statement in Seitz would seem to imply; there are five specimens in the British Museum and four in my own collection, two of the latter taken by me in Antioquia.

A. aricia Hew.

The type of *serenita* Fruhst. agrees well with that of *aricia* Hew., so the name falls as synonym. In the form from Peru, which I propose to call *portunus* subsp. nov., the yellow band of the fore wings is reduced to three subapical spots. Type and 16 co-types in the British Museum and 2 males in my own collection from Tambillo, Rio Tabacones, etc.

A. cocala Cram.

fufia Fruhst., described as a form of *A. trimina*, is the Colombian race of *cocala*; three males and two females are all labelled "type". The only specimen labelled as *lorzina* Fruhst. is a female of typical *cocala* bearing the very doubtful locality "Bogota". *Suapura* Fruhst. was not in the Fruhstorfer Collection, but from the figure it seems also to be identical with typical *cocala*, to which most Venezuelan specimens belong.

urracina Fruhst. and *cocalina* Fruhst. (the latter likewise described as a race of *A. trimina*) are synonyms to *urraca* Feld.

riola Fruhst., of which two females from São Paulo are the types, is a good subspecies, but *didia* Fruhst. from Espiritu Santo does not seem to differ from it. *canima* Fruhst. is the form figured in Seitz as *cocala*, not *riola*, as stated in the text; it is the most distinct race of the species, the types being a pair from Santa Catharina and a male from São Paulo.

A. baetia Feld.

fidicula Fruhst. is founded on a male from Honduras and another from Espiritu Santo (?) having an unusual amount of white in the band of the fore wings; this character happens to be present in Boisduval's type of *oberthürrii*, but as the Espiritu Santo specimen is a little different beneath, Fruhstorfer's name might stand for the race from that district if it really came from there, which is rather doubtful. *davisii* Butl. is a form of *A. phylaca* Bates, but the *davisii* of Fruhstorfer is practically identical with *fulca* Fruhst. (type from Bolivia) so the latter name will stand for the race from that country and Peru. Specimens from the Lower Rio Madeira also seem to belong here.

A. sichaeus Butl.

privata Fruhst. is synonym to *sichaeus*; *irisa* Fruhst. is a good subspecies, but *leucoptera* Fruhst. is synonym to it.

A. phylaca Bates.

This is the first of several species whose extreme forms have hitherto been placed in separate groups. Typical *phylaca* Bates is the Central American race and occurs in company with a form (*pseudaethalia* form nov.) which resembles *aethalia*, but has the yellow band of fore wings somewhat narrowed posteriorly and scaled with whitish on the inner margin; type in the British Museum from Costa Rica. *aethalia* Feld. is the race from Colombia, where it seems to be very constant. *davisii* Butl. is the race from Ecuador, Peru and Bolivia, and to it *metana* Fruhst. is synonym. *frusina* Fruhst. was described as being from Eastern Bolivia, but

the only specimen in the Fruhstorfer Collection (not labelled "type") is one from Matto Grosso; it is a slightly different and larger form than *davisii*. Whether *pollina* Fruhst. really belongs here is rather doubtful as it is in some respects nearer to *A. pseudococala* Hall; in addition to the type female from French Guiana there is a second female from that country, another from Teffé and a male from French Guiana presumably belonging here, but having a very characteristic yellow bar in the cell of the fore wings.

A. thesprotia Feld.

This is the *A. euboea* of Fruhstorfer, but not of Felder, whilst Fruhstorfer's *thesprotia* is *A. melona* Hew.! Felder's type of *thesprotia* is a rather worn female from Surinam. The typical race ranges through the three Guianas and the Amazon to Peru and Bolivia; *hilaria* Fruhst., the type of which is from Peru, is synonym. *jurnana* Butl., to which *phylacides* Fruhst. and *sarana* Fruhst. are synonyms, is the dimorphic form in which the band of the fore wings is white at least to vein 2; this form is more prevalent in the western part of its range, but a single specimen was bred at Para by the Rev. Miles Moss amongst a number of typical *thesprotia*. *manaca* Fruhst. is a good subspecies from Matto Grosso and *georgias* Fruhst. is its dimorphic form corresponding to *jurnana*. *fabricia* Fruhst. from Colombia is a good subspecies and appears to be monomorphic.

A. delphicola Fruhst.

This species is best distinguished from *A. thesprotia* by the prominence of the second (outer) white spot in cellule 2 of the fore wings beneath. The breeding experiments of the Rev. Miles Moss have shown the two species to be perfectly distinct and this is borne out by the genitalia, whilst in addition *delphicola* appears to be monomorphic so far as we know at present.

The type of *delphicola* is not in the Fruhstorfer Collection, but specimens from Tarapoto, Pcbas and Upper Amazon stood under this name and from these the types of *practura* Fruhst., a male from British Guiana and females from Para, Surinam and French Guiana do not seem to differ, the name, therefore, sinking as synonym.

ophellas Fruhst. with types from Espiritu Santo and Paraguay and a co-type bearing the obviously incorrect locality "Mexico", is a good subspecies and is also represented in the Museum from N.E. Argentina. *nava* Fruhst. does not seem to be in the Fruhstorfer Collection, but the figure in Seitz looks like an underside of *ophellas*; if identical the name has line priority.

(To be continued.)

NOTES AND OBSERVATIONS.

THE LURE OF THE LAMP.—I read Mr. James's article on pp. 25-28 with very much interest, and as I was the hero of the attempt to "semble" with a male moth I may perhaps be allowed to give the facts. The species was *Notodonta trepida*, not *trimacula*, as Mr. James says, and it was beaten by me out of a very small seedling oak in Park Hill Enclosure, near Lyndhurst, on June 1st, 1895. As none of us was at all familiar with the species it was thought to be a female, and I decided to try "sembling" with it the same evening. I cannot now remember what was used for a "sembling" cage, but the moth was hung up on a tree in Beechen Lane and we patiently waited for males to appear, until the very unladylike activity of the specimen, which buzzed about in the cage, aroused suspicions, and we came reluctantly to the conclusion that it *was* a male, and "sembling" operations ceased. It is quite true that "light" was not utilized much in those days by the North London Natural History Society members in either Epping Forest or the New Forest, but I remember using it once, not as an attraction, but as an illuminant, at Chingford in October, 1893. A friend and I had found a crippled female of *Himera pennaria*, which we placed on an oak trunk, and hung a lantern on a convenient twig above it, at a height of about 7 ft. We then stood in front of the tree and netted the males as they came up, getting a nice little series in good variety.

Mr. James is right about *Stauropus fagi*; the capture of a specimen in Epping Forest was a notable event, and that of a larva, generally by beating, much more so in those days. On the occasion of a "North London" excursion to the Forest on May 27th, 1893, a very fine typical specimen was spotted on one of the big beeches in Monk Wood, and shortly afterwards I had the privilege of taking a rather small black male off one of the beech saplings in the vicinity. The black form was a novelty then, and it is exceedingly interesting, but not surprising, to learn that it is apparently now the rule in Epping Forest. The N.L.N.H.S. used to have an autumn excursion every year for larvae, when *Demas coryli* (occasionally), *Hylophila prasinana* (very common), *H. bicolorana* (occasionally), *Lophopteryx camelina* (common) and *Ephyra trilinearia* (very common) used to be beaten, mostly from beech, at High Beach; also the four common Hook-tips and *Cilix glaucata* (occasionally) and, very rarely, *Stauropus fagi*; *Notodonta ziczac* on sallow. What a pity that we never thought of having evening excursions to try "the lure of the lamp"! It would have been a mighty revelation to us, for in all probability the "bags" in those days would have been even more "extensive and peculiar" than Mr. James found last year.—C. NICHOLSON; Tresillian, Truro, Cornwall, May 31st, 1938.

BUTTERFLIES ATTRACTED TO LIGHT.—When collecting with a lamp near Brockenhurst, on July 25th this year, a female *Thecla quercus* alighted on my sheet at 10.45 p.m. (summer time). I happened to

watch its arrival, and it appeared to fly deliberately towards the light.—(Capt.) W. B. L. MANLEY; Field House, Minstead, Lyndhurst, Hampshire.

EARLY EMERGENCE.—When beating in Oxfordshire on May 8th this year I obtained a larva of *Strymon pruni* which pupated on May 12th. The butterfly emerged on June 2nd and was a male of normal size.—(Capt.) W. B. L. MANLEY; Field House, Minstead, Lyndhurst, Hampshire.

ARGYNNIS AGLAIA L. IN ESSEX.—This butterfly, which has not been recorded for Essex for many years, seems to have disappeared from the county forty or fifty years ago. E. A. Fitch (*The Essex Naturalist*, 1891) says, "local and apparently disappearing from the county", but gives no definite records. W. H. Harwood (*Victoria County History*, 1901) says, "recorded by old collectors as occurring near Colchester, at Lexden Heath, Dedham Birch Wood, Bromley Thicks, and woods at West Bergholt; but if *aglaia* ever was a North Essex species, it must have long ago disappeared, and there are no trustworthy records from any other quarter". It is therefore interesting to know that *aglaia* has now been established in Essex for several years. Mr. H. C. Huggins informs me that it has been seen in small numbers near Westcliff-on-Sea. Mr. G. A. Pyman, of Maldon, found it near Danbury, between Chelmsford and Maldon, in 1936, and I have myself taken several in the same locality this year.—W. S. GILLES; The Cottage, Bocking, Braintree, Essex, July, 1938.

ARGYNNIS SELENE, A BUTTERFLY NEW TO THE ISLE OF RHUM.—In January I published a list of the butterflies observed in the Isle of Rhum and other islands. This included records of *Argynnis selene* from Soay and Skye, but not from Rhum. Yesterday, along the Kinloch Glen and on the Kilmory alluvial flats, the same species flew in some plenty at elevations not more than 100 ft. above sea level. To-day the party climbed Barkwal. At a height of 1500 ft. we were surprised once again to encounter *Argynnis selene* flying with clouds of *Perizoma minorata* and *Xanthorhoe montanata*. Many of the former species were very dark indeed, whilst some of the latter resembled Shetland specimens very closely.—(Prof.) J. W. HESLOP HARRISON; Isle of Rhum.

RECENT LITERATURE.

Suffolk Naturalists' Society.

Suffolk has been exceptionally fortunate in the number and quality of its entomologists. Starting with the Rev. William Kirby, of Barham, it has produced or temporarily sheltered a long line of collectors, students and dealers, such as is only rivalled, perhaps, by such other favoured localities as the New Forest. The church has

been very much to the fore. The Rev. Joseph Greene (of pupa-digging fame), the Rev. E. M. Bloomfield, whose list of 1890 is only now completely superseded, the Rev. C. T. Cruttwell and A. H. Wratislaw all added considerably to the knowledge of the county's fauna. Amongst laymen, Curtis, the numerous Ipswich collectors, and, more recently, the Harwoods of Colchester have all provided material for the latest *Catalogue of the Lepidoptera of Suffolk* which appeared last December as the first memoir of the Suffolk Naturalists' Society. This is a volume of 214 pp., unfortunately devoid of any index, listing 1505 species, of which 658 are Macros. The butterflies have been recorded by Dr. Vintner, the Macros by the Rev. A. P. Waller, and the Micros by Bishop Whittingham; the whole bears the obvious imprint of the Secretary, Claude Morley. The introduction contains an all too brief account of the physical features of the county, which is here and there amplified in the body of the work by allusions to the type of country affected by the various species. A note of the species peculiar to the Breck Sand area would, for example, have been of much more than local interest, and valuable to the various associations interested in the preservation of this district. Asterisks are prefixed to the names of species which have not been definitely recorded in the county for over fifty years, a formidable number, including such as *Arctia plantaginis*, *Bomolocha fontis*, *Catocala sponsa* and *C. promissa*, *Orgyia gonostigma*, *Boarmia roboraria*, *Pseudopanthera hippocastanaria* (Meyrick's nomenclature is used throughout), *Crocota gilvaria*, *Endromis versicolor*, *Lasiocampa trifolii*, *Melitaea athalia*, *Melanargia galathea*, *Pararge aegeria*, *Thecla pruni* and *T. betulae* and *Pamphila comma*. It is remarkable to find *P. aegeria* in this list, which, for the rest, consists largely of migratory species of rare occurrence everywhere; but *Apatura iris*, refreshingly, is not on the list. The use of Meyrick's very remarkable nomenclature and classification throughout is unfortunate; though understandable for the Micros, for which no other exists, there is little excuse for employing it for the Macros—incidentally it is not in use at the British Museum (Natural History), except for the Micros. The list is marred by an unnecessary number of (fortunately mostly trivial) misprints and certain objectionable idiosyncrasies (?), such as "EAnglia" for "E. Anglia", but these do not detract from its very high value and excellent form. To call it "final" is putting it too high in the scientific sense, but it is explained that this is probably only true in relation to the "irregular" memoirs of which it is the first.

The latest part (Pt. III, vol. iii) of the Transactions and Proceedings of the Society was also issued last December, and as usual, contains a large amount of entomological material. The principal contribution is the Secretary's third and last part of the Hymenoptera of Suffolk. This covers the Ophioninae, the Braconidae and Evanidae, and brings the total for the country up to 2255 species; incidentally the list of Braconidae is so arranged as to include a complete list of the British species. Amongst the "Observations" are some twenty pages of miscellaneous entomological notes of varied interest; but here again misprints are far too numerous.—N. D. R.

The London Naturalist for 1937.

In its study of the invertebrate fauna of Hyde Park and Kensington Gardens, and the survey of Limsfield Common, The London Natural History Society has undertaken two useful tasks likely to prove of real value. The former has not yet produced published results, but the first reports on the latter undertaking include preliminary lists of the Diptera and Plant Galls. The 17 pp. of entomological notes and records cover a wide field, and include reference to courtship in *Dolichopus popularis* and *Poecilobothrus nobilitatus*, variation in *Enallagma cyathigerum*, Aculeates of the Norfolk coast, Sussex Diptera, and Mr. Burkill's Plant Gall Records and Notes on British Butterflies for 1937.

Systematic Notes upon British Aquatic Coleoptera. Vol. I. By F. BALFOUR-BROWNE. 96 pp. London: Nathaniel Lloyd & Co., 1938. Price not stated.

This little volume, as its title-page informs us, is a corrected and revised edition of a series of papers which appeared in the *Entomologist's Monthly Magazine* from 1934-1936. It deals with the Hydradeephaga, is admirably illustrated, and its attenuated appearance, as coleopterists already know, is no criterion of its excellence and importance.

Proceedings and Transactions of the South London Entomological and Natural History Society, 1937-38.

This volume of 98 pages is fully up to standard. Over half of it is occupied with the accounts of meetings, including field meetings, which seem to have at last recovered their lapsed popularity. The presidential address includes an interesting account of secondary sexual characters in British Coleoptera, and Mr. Coulson also contributes a paper on the British Clavicornia. The other papers include an account of changes in the insect population of Britain during the last 100 years, by Dr. K. G. Blair; Notes on *Pachythelpha villosella* by H. C. Huggins; Variation in *Gonodontis bidentata*, by Dr. E. A. Cockayne; *Metzneria littorella* Douglas, by S. Wakely; and Notes on *Nemobius sylvestris*, by E. E. Symes. There are eight excellent plates.

Lancashire and Cheshire Entomological Society.

The 58th, 59th and 60th annual reports and proceedings are issued as a single volume of 44 pages, to which are added 36 pages of continuation of the Revised List of the Lepidoptera of Lancashire, Cheshire and Westmorland, by Wm. Mansbridge. This runs from *Oecophora* to *Micropteryx*, pp. 209-244, and is uniform with the preceding parts. Considering its very small membership, the society is to be congratulated on publishing so valuable a work with such slender resources; yet it is surprising that, with so much interesting country almost on its doorstep, membership is not higher. There are so many tasks a thriving society could undertake in the district it covers.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*May 26th, 1938.*—The President in the Chair.—The evening's programme was the exhibition of living objects. Living Lepidopterous larvae were shown by Messrs. S. Wakely, T. R. Eagles, S. D. Royffe, R. W. Attwood, F. D. Coote, W. H. A. Harris, B. S. Goodban, S. W. C. Williams, Baron de Worms, etc.; ova by Mr. V. E. August; Col. P. A. Cardew exhibited an Indian Lycaenid *Rapala schistacea*, said to have been taken some years ago in Savernake Forest; Mr. Turner a long series of *Triphaena comes*, including many local forms.

June 9th, 1938.—F. J. Boulton, Vice-President, in the Chair.—Mr. Denis exhibited a photograph of the ovum of *Leptidea sinapis*; Mr. Howard, series of *Biston hirtaria* and of *Monima* (*Taenioctampa*) *gracilis*, taken in Scotland; Dr. K. G. Blair, the larvae of *Coleophora crocogramma* Meyr (1896) on *Stachys lanata*, and a living specimen of *Cetonia aurata* from Godalming; Mr. H. W. Andrews, a ♀ of the Ichneumon *Rhyssa persuasoria*, a parasite on the wood-wasp *Sirex gigas*; Mr. Pollard, for comparison, the allied Ichneumon *Rhyssa curvipes*; Mr. Stephens, a number of local Coleoptera from the Chatham area; Mr. H. Moore exhibited and read notes on the "Bulldog Ant", *Myrmecia nigriventris* of Australia; Mr. Atkinson showed an example of *Cupido minimus* bred from a larva taken at Dover; Mr. Wallace Norton described his experience in killing insects like Zygaenids by total immersion in pure petrol; Mr. Wakely exhibited larvae of *Odontesia carmelita* from Oxfordshire, a twig of willow with the gall of *Saperda populnea* (Col.), larvae of *Depressaria nervosa*, of *Alucita spilogactyla*, and of *Coleophora vibicella* from the Isle of Wight. Preliminary reports of several field meetings were communicated.—H. J. TURNER (*Hon. Editor of Proceedings*).

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club took place at 1/5 Albany, Piccadilly, on Tuesday, May 31st, 1938, Mr. R. W. Lloyd in the Chair. Members present, in addition to the Chairman, Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis, Mr. J. E. Collin. Visitors present: Dr. K. G. Blair, Dr. Karl Jordan, Sir Guy A. K. Marshall, Dr. S. A. Neave, Mr. Otter, Capt. N. D. Riley, Mr. W. Rait Smith, Mr. W. H. T. Tams. The meeting was called for 7.30 and dinner was served at 7.45. After dinner the Chairman's collection of Lepidoptera and Coleoptera were inspected, and many of the party took the opportunity of specially looking at portions of the Coleoptera which contained rare specimens collected by the Chairman many years ago. A further collection of Coleoptera, made in the neighbourhood of the Chairman's country seat, Treago Castle, was also on view. This district, but little worked in the past, would appear to be a very prolific spot for species of that order. Mr. W. Rait-Smith was elected a member of the Club. The party broke up at between 11 and 11.30, after a very pleasant and most entertaining evening.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).

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[No. 90]

FURTHER NOTES ON *DANAUS PLEXIPPUS* L. IN THE BRITISH ISLES.

BY CHARLES NICHOLSON.

SINCE the publication of my paper in the November and December parts of this magazine for 1935 thirty more appearances have been reported, and are now dealt with in these supplementary notes ; but I should like first to correct a small error in the first entry on p. 250 in the November, 1935, issue : West Cover should be West Cove.

The specimen at Dudbridge, Glos (August 29th, 1934) was seen twice in the garden of a friend of Mr. Fletcher's by the house-keeper, who picked out *plexippus* from a series of similar Danaids and illustrations, shown to her by Mr. Fletcher, as the butterfly she had seen.

The specimen at Bourton-on-the-Water (September, 1935) was reported to Mr. Clutterbuck by Col. Donovan, whose daughter saw it in the garden and called her father to catch it ; but unfortunately when the Colonel went out it had gone and was not seen again. Miss Donovan knows *chrysippus* and *genutia* from India and *plexippus* from the Canary Isles.

The specimen at Penally on October 13th, 1935, was seen by its captor to have been caught by a meadow pipit which was trying to eat it. On Mr. Scott-Brown's approach the bird flew away and he secured the specimen, which was identified by his tutor, Mr. R. N. Winnall, to whom he gave it for his collection.

Miss Harding's specimen of August 8th, 1936, was the second seen by her at Sowley, and the fourth recorded for the district. At my invitation Miss Harding very kindly made inquiries as to boats arriving about that time, and found that S.S. "Umtala" had docked at Southampton on the 7th, after a voyage from Beira via Port Elizabeth and Las Palmas (Canaries). She also said that she thinks that the two specimens she has seen at Sowley came from Southampton, as both flew in from the east, and Sowley is right on the shore of the Solent, and only about 10 miles from Southampton Docks "as the crow flies". It is rather a suggestive coincidence that on August 18th of that year a specimen was seen at Meonstoke, Petersfield ; one on the 22nd at Burley, New Forest ; one on the 24th at West Meon ; and one on September 8th near Selborne. It is possible that the Sowley and Burley records refer

to the same individual, as Burley is 10 miles N.W. of Sowley, but I see no reason to think that the three other Hants records have any connection with the Sowley one, though it is possible that they may all refer to another individual, as Meonstoke is 4 miles S.W. of West Meon and Selborne is 8 miles N.E. of West Meon, and it may have flown from Meonstoke towards West Meon and thence to Selborne.

The two records for September 28th, 1937, probably refer to the same specimen, Slapton being about $3\frac{1}{2}$ miles S.W. of Stoke Fleming, and the butterfly continued its course along the Torcross Road, which runs S.S.W. along Slapton Sands with water on both sides. There was a strong N.W. wind blowing at the time across its line of flight. From all the data in hand there seems to be no reason to doubt the identity of any of the specimens here listed, but I could not get into touch with Messrs. Hargreaves and Wood, who recorded the specimens at Burley and West Meon in August. When I went to see the gardens at Bosahan near Helford last April, Lady Seaton told me that when she was sitting with the late P. D. Williams in the garden at Lanarth, St. Keverne, a Milkweed butterfly flew close to them and settled on the window-ledge. Unfortunately she could remember neither the year nor the month, but she thought it might very well have been 1933, from which I am inclined to think that it may have been the specimen reported in this magazine (67 : 209) as seen on September 30th of that year at Mawnan Smith, which is 2 miles N.E. of Bosahan, and the latter is 3 miles due north of Lanarth. One thing in favour of that date is that it was a warm, sunny day.

Another matter of interest is the capture of a pair of *Danaus genutia* in a garden in Upper Clapton, N.E. London, on August 20th, 1930. This is recorded by Mr. C. W. V. Gane, of Marton Hall, Bridlington, in a letter to me dated December 4th, 1935. The insects were taken by a small boy staying at his aunt's house at the above address and are now in Mr. Gane's collection. Their identity was determined by Mr. Riley, and Mr. Gane adds a significant note to the effect that *genutia* is common in Ceylon, and most of the Far East boats berth at Tilbury, which is only 5 miles S.S.E. of Clapton.

On bringing up to date the summary of records shown on p. 269 of vol. lxxviii I found that there were several small errors in it and that the total number of records was really 110, which, less the 7 probable duplicate appearances, gave 103 specimens, of which 47 were caught and 56 seen only, up to date of publication.

The number of records added since (30) brings the grand total of recorded appearances to 140, which, less a total of 10 probable duplicates in all, leaves 130 as the number of specimens seen only

or captured in these islands between 1875 and the preparation of this supplement.

The revised county appearances recorded are now as follows :

IRELAND.—Kerry (1), Cork (1), Limerick (1), Dublin (1).

WALES.—Pembroke (4), Cardigan (1), Glamorgan (5).

ENGLAND.—Scilly Isles (4), Cornwall (23), Devon (16), Somerset (3), Dorset (17), Gloucestershire (4), Hampshire (11), Isle of Wight (6), Sussex (22), Kent (2), *Surrey (1), *Middlesex (1), Essex (2), *Bucks (2), *Oxfordshire (4), *Northamptonshire (1), Suffolk (2), Lancashire (1), Yorkshire (2), Durham (2). Inland counties starred, as before.

The revised tabulation by periods is as follows :

1876 to 1932 . . .	Recorded . . .	63 (caught 36, seen only 27)
(both inclusive)	(less probable duplicates, 3)	(24)
1933 . . .	Recorded . . .	35 („ 8, „ 27)
	(less possible duplicates, 4)	(23)
1934 to 1937 . . .	Recorded . . .	42 („ 8, „ 34)
(both inclusive)	(less possible duplicates, 3)	(31)
Total number recorded . . .		140 („ 52, „ 88)
(less duplicates, 10) . . .		(130) (78)

The increasing discrepancy between “ caught ” and “ seen only ” suggests that the scientific spirit is spreading and encouraging observation rather than acquisition. But the real explanation probably is that up to the end of the last century few people but entomologists paid much attention to butterflies, and consequently 71% of the specimens seen were caught ; whereas in the present century, thanks, perhaps, to the spread of Nature study, that figure was almost reversed, only 28% having been caught.

It is significant that of the 30 new records all but 2 (Middlesex and Oxfordshire) were in maritime counties. The solitary specimen in Middlesex probably came off a ship in the London or Tilbury Docks, the 4 Gloucestershire ones (all in different years) presumably landed at Avonmouth ; the two Suffolk specimens (also in different years) no doubt flew from London or Tilbury, as there is no nearer likely port for boats arriving from America or the Canaries.

A letter to Bristol brought me a reply from the Curator, H. Tetley, of the Museum, to the effect that “ one of the staff at Avonmouth has made exhaustive inquiries, and finds that no moths or butterflies have ever been seen amongst the bananas there. The great majority of bananas are placed in vans and taken by rail to Birmingham and other towns, and only a small quantity are ripened at Avonmouth. Bananas are imported all the year round ”. As bananas come over green and unattractive I did not expect that many Lepidoptera would be found amongst

Date.	Locality.	Observer.
1906, Sept. 29 . . .	Felixstowe, Suffolk	T. S. Barrett
1926 " 8 . . .	nr. Countisbury, Devon	Stanley Morris
1929, Oct. 12 . . .	Niton, I. of W.	R. Prendergast
1931, June (?) . . .	Framlingham, Suffolk	Dr. C. H. S. Vinter
1932, Sept. 15 . . .	Llanbadarn Fawr, Cardigan	Dr. J. H. Salter
" " (?) 20 . . .	Fossebridge, Glos	C. F. Parks
" " 21 . . .	Bognor, Sussex	E. H. Hewett
1933, Aug. 11 . . .	nr. Ditchling Beacon, Sussex	G. T. St. J. Steadman
1934, " (2nd week) . . .	Off Beer Regis, Devon	Miss Mercer
" " 25 . . .	Magdalen Coll., Oxford	Dr. B. M. Hobby
" " 29 . . .	Dudbridge, Glos	Miss Wright
1935, July 17 . . .	Ashley, New Milton, Hants	Leslie F. Burt
" Sept. 25 . . .	Coverack, Cornwall	A. T. Cummings
" " (?) . . .	Bourton-on-the-Water, Glos	Miss Donovan
" Oct. 4 . . .	South Huish, Devon	Capt. J. O. N. Ward
" " 13 . . .	Penally, Pembroke-shire	G. Scott-Brown
1936, Aug. 8 . . .	Sowley, Lynton, Hants	Miss P. E. G. Harding
" " 11 . . .	Start Point, Devon	A. W. Godfrey
" " 18 . . .	Meonstoke, Petersfield, Hants	S. P. Rawlins
" " 22 . . .	Burley, Hants	F. M. Hargreaves
" " 24 . . .	West Meon, Hants	G. B. Wood
" Sept. 4 . . .	Lean Water, Lizard, Cornwall	H. C. Griffith
" " 8 . . .	Oakhanger Pond, Selborne, Hants	J. P. Russell
" " 16 . . .	Salcombe, Devon	Mrs. M. Besant
1937, " 8 . . .	Selsey Bill, Sussex	Tom Trought
" " 28 . . .	Slapton, Devon	H. O. Mills
" " 28 . . .	Stoke Fleming, Devon	H. M. Churchward
" Oct. 2 . . .	Harrow, Middx.	K. Clarke
" " 3 . . .	Lydney, Glos	H. Angel

c. captured

them, but I thought some might have come in the ships. It is not a matter of great importance, however, and banana ships are not the only fruit boats that reach our shores.

Since my paper appeared I have had the pleasure of reading Dr. C. B. Williams's article on "Butterfly Travelers" in the May, 1937, number of *The National Geographical Magazine*. Dr. Williams briefly refers to the known tendency and ability of butterflies on migration to fly in one direction without willingly deviating from their course, and as this tendency is at present inexplicable he wisely takes refuge in the blessed word "instinct" as the only "explanation" in the present state of our knowledge. Another interesting point in this connection is that "it would appear that, while the migrating instinct (one might almost call it 'hysteria') is on, they must continue flying until the stimulus has worn itself out".

Dr. Williams's "flying hysteria" seems to explain the power of Lepidoptera to travel long distances over both land and water, but the explanation of the urge that starts such flights and,

Reference.	Remarks.
<i>Trans. Suffolk Nat. Soc.</i> , 1 : 30	..
<i>In litt.</i> , 2. xi. 35	Flying up and down cliffs and passed out to sea in direction of Welsh coast
<i>Times</i> , 16. x. 29	On Michaelmas Daisies
<i>Trans. Suffolk Nat. Soc.</i> , 2 : 104	Exact date uncertain
<i>North Western Naturalist</i> , Dec., 1932	On Michaelmas Daisies
<i>In litt.</i> , 14. xi. 35	..
<i>Times</i> , 5. x. 32	On "Sedum" in garden
<i>In litt.</i> , A. F. Brazenor, Brighton, 1. ii. 37	..
.. Mrs. K. J. Grant	Two specimens seen from a boat
.. to Comm. Walker, 26. viii. 34	Flew over wall
.. T. B. Fletcher, 15. xii. 37	On a garden hedge
<i>Journ. Soc. for Brit. Ent.</i> , 24. iii. 36, p. 121	(W. Parkinson Curtis)
<i>Entom.</i> , 69 : 94 (F. Pennington)	..
<i>In litt.</i> to C. Granville Clutterbuck	On Buddleia and Michaelmas Daisies in garden
<i>Entom.</i> , 69 : 230	Sunning itself on a wall
<i>Field</i> , 23. xi. 35	Caught by meadow pupit on cliff
.. 22. viii. 36. <i>Entom.</i> , 69 : 226	Hovered over bramble and flew west
<i>Entom.</i> , 69 : 226	Came in from the sea and flew N.N.W.
<i>In litt.</i> , correcting <i>Entom.</i> , 69 : 259	Flying due north
<i>Field</i> , 12. ix. 36	..
"M. News", 18. ix. 36. <i>Entom.</i> , 70 : 8	Flying north
<i>Entom.</i> , 70 : 8	..
"M. News", 22. ix. 36. <i>Entom.</i> , 69 : 259	On a bulrush head
<i>Entom.</i> , 70 : 285	On geraniums in garden
<i>In litt.</i> to Capt. Dannreuther, 28. ix. 37	On ragwort after flying East
<i>Entom.</i> , 70 : 253	Flew S S.W. over Royal Sands Hotel
<i>Ibid.</i> , 70 : 246 (E. W. Classey)	On valerian
<i>News Chronicle</i> , 7. x. 37. <i>Entom.</i> , 70 : 249	..
	On Michaelmas Daisies ; now in Glos Mus.

especially, determines their direction is still unknown. In the case of *plexippus* the migration flight north and south has, of course, become a habit and is therefore a "racial instinct", but I cannot see that this can be adduced to account for the easterly "migration" necessary for the theory that the butterfly comes to us from America direct. The fact that the specimens that have reached our shores "appear to belong to the N. American type" (except the pair of *genutia* above-mentioned) certainly precludes their having come from Brazil, as C. G. Barrett says (*Ent. Mo. Mag.*, 29 : 163); but it does not preclude the possibility of most of them at least having come to us from the Madeiras or Canaries, where *plexippus* is common, having no doubt reached those islands originally from N. America in the same way as some reach us nowadays on board steamers crossing the North Atlantic. The speeding up of Atlantic travel in recent years is all in favour of this mode of transport, and that migrants will remain on a ship during a voyage of some days' duration is shown by Brigadier-General Tulloch's notes in this magazine (69 : 143). And again, in

this magazine for 1936, p. 36, Mr. Welti mentions a specimen of *D. chrysippus* (form *dorippus*) that flew on to the S.S. "Orient" whilst in the Red Sea and settled down in the smoking-room on the upper deck. General Tulloch (*in litt.*) says that "an entomological friend has just lately (January, 1936) returned from the Canary Isles, and tells me that in October the islands were swarming with *plexippus*". Does this not suggest a reason for the unparalleled number that have reached us in recent years—that the islands are becoming over-populated and emigration is taking place, in addition to the possible transport of specimens by the "Union Castle steamers, which are either pure fruit boats, or mail steamers, or pleasure cruisers", as General Tulloch says (*loc. cit.*)?

Dr. Williams has very kindly sent to me the following extract from a letter dated March 22nd, 1938, received by him from B. Struck, Corpus Christi, Texas:

"While working as a cargo checker during the summer of 1937, I found it necessary to spend most of my working hours in the holds of ships, and I was surprised at the variety of insect life which drifted in from time to time, particularly butterflies. They seemed to have a curiosity concerning open hatches, and rare was the day when less than 2 or 3 would drift down into the lower hold.

"On the afternoon of September 12th, 1937, in No. 4 hatch of the coastwise steamer, "Southerner", so many entered the lower hold that I decided to take notes on species concerned, obtaining the following: *Papilio philenor*, *Eurema lisa*, *Vanessa atalanta*, and a *Grapta* species. Each specimen spent some time fluttering about, not at all disturbed by the hustle and bustle incident to the discharging of cargo, in this case, pipe.

"Earlier in the month, a specimen of *Danaus plexippus* kept me company for an entire afternoon in the lower hold of a coastwise vessel, seemingly unable to discover a means of escape; and on numerous occasions *Libythea bachmanni* has been observed, likewise various species of Noctuid moths.

"Perhaps some mention should be made of the annoying species of biting flies, and the mosquitoes which infest the holds of nearly every coastwise vessel. As a means of transport for adult insects over considerable distances, ships must hold an important place."

A very valuable testimony in favour of the "assisted passage" theory.

One of my correspondents raises the question why, if *plexippus* comes to us from the Canaries (as I suggest), it should fly north in autumn, when in America it would then be flying south for hibernation. But is the custom of a species in a continent such as America with widely different climates any criterion as to how

that species will behave in a sub-tropical climate such as that of the Canaries? Evidently not, or *plexippus* would scarcely be producing larvae in November at Orotava, Teneriffe, as recorded by Mr. Sandeman (*Entom.*, 68: 127). If *plexippus* can depart from its normal custom so far as to produce larvae in autumn when it ought to be flying *south* for hibernation, is it any more remarkable that it might fly *north* in autumn on emigration than that it should fly *east* at that time, as it is supposed to do in order to account for the specimens observed in our islands?

Incidentally, a due north flight from Teneriffe and the Madciras would pass to the west of Portugal and the British Isles; to reach our shores it would have to come N.N.E., and would then pass over Portugal and parts of Spain and France. The only French specimen recorded appears to be one at La Vendée, September, 1877. The only Channel Islands one was taken at St. Peter's Port, Guernsey, on October 2nd, 1886 (*Entom.*, 19: 278). The only record for Spain appears to be one at Gibraltar, October 24th, 1886; and two Portuguese specimens—one at Oporto in 1886, and the other about 1890, taken 60 miles off Cape St. Vincent, direction of flight not given (*Ent. Mo. Mag.*, 29: 86)—seem to complete the list for Continental Europe.

As to the specimens taken when "playing about the rigging" of a Glasgow vessel 200 to 300 miles out on its way to New York, "somewhere about the year 1880" and given to the late J. J. F. X. King, C. G. Barrett thought there could "be no doubt that these were a portion of a migratory swarm on its way here" (*Ent. Mo. Mag.*, 29: 163). But as there is no information available about the direction of flight of these specimens, and how they got there is quite unknown, I think there is considerable doubt, and also no justification for Barrett's assumption. Dr. Williams very kindly tells me that, as most of King's collection is in the University of Glasgow, he inquired about a year ago whether these 3 *plexippus* were there, and was informed by Prof. E. Hinton that no trace of them could be found. Can any reader say where they are?

C. G. Barrett says in *The Lepidoptera of the British Islands* (vol. i [1893] pp. 114/5): "My own published requests for opportunities of examining British specimens have resulted only in the loan by Mr. W. H. Tugwell, its present possessor, of the specimen taken in Cornwall. . . . I have examined the records with care. There is no cause to suspect that the specimens were introduced into this country in the egg, larva or pupal stage. There can be no doubt that they were genuine immigrants. No species of the food-plant, *Asclepias*, is indigenous here." I have already touched on this question (*Entom.*, 68: 273). "*Danaus archippus* can only have reached us apparently directly from the

other side of the Atlantic, whether by its own extraordinary powers of flight and at a considerable elevation ; or by the help of crossing vessels ; or by a longer route with shorter sea passage from Brazil by the Cape Verde Islands, the Canaries and the S.W. of Europe. But the latter hypothesis is rendered improbable by the fact that the N. American form only has been found to have migrated."

In the *Entomologist's Monthly Magazine* (29 : 163) Barrett also has a note to the effect that "I have recently had occasion to show that the extraordinary immigration of *Danaïs archippus* to our southern and south-western shores must have been effected by direct flight across the Atlantic from N. America"; and he claims as confirmation of this view the "King" specimens already referred to above.

But I am afraid that I cannot accept the quotation from his book as "showing", or the "King" specimens as confirming, direct flight, and nothing that I have read or heard since my previous paper appeared leads me to modify my view that *plexippus* does not fly across the Atlantic from America to our shores.

Dr. Williams's statements, already quoted, about "flying hysteria" compelling butterflies to continue flying undeviatingly in one direction certainly explain how butterflies may cross comparatively narrow stretches of water, such as the English Channel (greatest breadth, 140 miles) Mediterranean (greatest breadth, 600 miles) and Red Sea (greatest breadth, about 200 miles), and Mr. Welti's, quoted above, shows that some may fly at night on such journeys, and that at least one specimen was not averse to taking advantage of a lift on its way. But I cannot agree that we are justified in supposing that therefore *plexippus* or any other species could cross the Atlantic (least breadth 2500 miles) on its own wings, or any other great stretch of water unrelieved by islands that could serve as resting-places *en route*.

With further reference (*Entom.*, 68 : 271) to the objection that the trade winds would be adverse to the flight of *plexippus* from Madeira or the Canaries to our shores, I see in Dr. Williams's book (*The Migration of Butterflies*, p. 29) that *Catopsilia eubule* (Pieridae) was seen in April, 1923, "flying straight out to sea in the teeth of the trades" from Seymour to Chatham in the Galapagos Islands, and surely *plexippus* is not inferior to *eubule* in powers of flight !

To the list of known and possible food-plants of *plexippus* given on p. 273 (*Entom.*, 68) must be added *Asclepias punila*, on which Dr. F. Martin Brown, F.R.E.S., records (in a letter to Capt. Dannreuther) having seen *plexippus* ovipositing at an elevation of 5800 ft. at Colorado Springs, U.S.A., on August 5th, 1932.

As the present whereabouts of only about 6 of the 52 specimens of *plexippus* captured in these islands are known, and it is desirable

that all should be available for reference if need be, it has been suggested that I should add to these notes an invitation for information concerning the present locations of the remaining 46, and I shall be glad to receive post cards accordingly, giving also the sex of the specimen in each case. The male is distinguished by a black sex-mark near the centre of each hind wing.

Tresillian,
Truro,
Cornwall.

COLIAS CROCEUS IN ESSEX.—On August 2nd this year *croceus* was flying in some numbers (8 or 10 seen) in a clover field near East Mersea. Three were caught, including one female, all in very fresh condition. Again on the 4th inst. about a dozen were seen in a lucerne field at Tolleshunt D'Arcy, five males being caught.—W. S. GILLES; The Cottage, Bocking, Braintree.

COLIAS CROCEUS IN HERTS.—A male of this butterfly was seen flying S.E. at its usual speed at 12.15 p.m. across an old residential road, towards the main London-Glasgow railway. It is over five years since I saw the Clouded Yellow in this district. It then occurred every season regularly in a gravel-pit which contained red clover; only this has now been dug up completely.—JOHN HUGHESDON; The Anchorage, Aldenham Road, Bushey, Herts.

HOMOEOSIS IN *LYSANDRA CORIDON*.—The following example of homoeosis in *Lysandra coridon* may be of interest. It is recorded on p. 24 of Bright and Leeds on *coridon* that a male was taken in 1932 with an additional wing of abnormal shape on the right side, between the fore and hind wings. In the present case there is also an additional hind wing on the right side, the two hind wings on this side being, however, joined together, so as to form one combined wing, showing the characteristics of two. At a casual glance it appears to be a normal male, with one rather small hind wing, but on closer inspection it is plain that the apparent one wing is really two. In each separate part of this wing (which I shall refer to as "subwings") on the underside there is a white discoidal, and all the border chevrons are present in each, but no border spots. The chevrons are much reduced in size, especially in the upper subwing. Each has two submedian spots only, and no basal spots. The upper subwing is about one-third smaller than the lower. On the underside there is no obvious join between the two, but on the upperside there is a very distinct line or ridge showing the join. In spite of this fusion of two wings, the whole remains considerably smaller than the corresponding wing on the left side; and the shape of the outer margin of the whole wing is rather like a letter C on a rather larger C. The insect was taken by me in Dorset on July 30th, 1938. I have set it to show the underside, as the duplication of the wing is more striking on this side.—NORMAN WATKINS; Belcombe Court, Bradford-on-Avon, Wilts.

MNIOPHAGA: A NEW GENUS OF *GELECHIADAE*, WITH
REINSTATEMENT OF *PORTLANDICELLA*
RICH. AS A SPECIES.

BY F. N. PIERCE, F.R.E.S., AND H. W. DALTRY, F.R.E.S.

THE little group comprising Genus 20 in *The Genitalia of the Tineina* (p. 10) requires a name, and we propose **Mniophaga**, and select *Gelechia similis* Stainton as the genotype.

This group was included in the genus *Gelechia* in Stainton's *Ins. Brit.*, 1854, p. 115. In 1895 Meyrick (*Handbook*, first edition, p. 18) continued to leave them in the large group *Gelechia*, of which the type is *Tinea rhombella* Schiff, 1776. In 1901 Staudinger removed them to the genus *Bryotropha* Hein. (*Tinea terrella* Schiff., 1776). This type we have not been able to locate. Meyrick (second edition, 1927) ignored this division and left the group in *Gelechia*, but, curiously, started the genus with the whole of the *Mniophaga* species thus leading one to suspect that he considered that this group most nearly represented Hubner's *Gelechia*. In 1935 the publication of the *Genitalia of the Tineina* revealed the fact that the genitalia of this little group form a distinct compact genus. The distinguishing character is the rhomboid signum of the female, set with teeth at the four corners. This separates the group from all the others. and for it we now propose the name *Mniophaga*. The larvae are moss-feeders.

Description of the genitalia. —Uncus spatulate, indent at either side, emitting three or four spines. Gnathos deep, broad pointed. Costa tapered. Valvula clavate. Sacculi deeply and widely apart. Saccus extended, long, narrow. Ovipositor not retractile. Signum rhomboid with teeth at the four corners, varying slightly but in general form constant.

The genitalia of the male of all the species run remarkably alike, but by examination of these organs in a large number of specimens it is possible to decide to which species they belong. The female is slightly easier, as the ostium plate (difficult to describe in words) shows decided differences, and taken in conjunction with the signum enables the species to be determined.

The species run rather alike in the wing markings, and difficulty in determination is increased on account of melanic variation in most of the species. Thus the dark form of *M. similis*, known as *confinis* Stainton, was at one time considered a separate species.

M. senectella Zeller (1839) is reputed also to have a dark form, var. *obscura* Heinrich, but it is still doubtful if this really belongs to *senectella*. *Mniophaga galbanella* is quite distinct, but it is rather curious that so far the female of this species is unknown; we should be grateful to anyone finding a female in his series, if he would allow it to be examined in order to see if it conforms with the other females.

Mniophaga basaltinella Zeller (1839), the beautifully mottled species, is again fairly constant. *M. umbrosella* has the fascia divided, forming two spots. *M. affinis* has the fascia complete; but there is considerable mystery about *M. mundella* Douglas. The first account we have been able to trace is in the *Trans. Northern Ent. Soc.*, October 4th, 1862. There Mr. C. S. Gregson called attention to a series of *Gelechia mundella* Dgls. varying from the beautiful pale form with black spots to very dark specimens with white markings like *Gelechia affinis*, and observed that he had that year taken the light and dark specimens *in cop.* freely from 2 to 4 p.m. on the sandhills (? Wallasey, F. N. P.) in May. About a year ago Mr. Daltry raised the question whether these specimens were light and dark forms of the same species. He took forms apparently similar to the above on the Deal and Wells (Norfolk) sandhills. Examination of the genitalia revealed that both species, *mundella* and *affinis*, were present, though the latter were more suffused with yellowish-white scales than in typical *affinis*. Dr. Oscar Meder, of Keil, writes that Mr. C. S. Larsen, of Denmark, published an account of having caught in Denmark from the fields (? heaths) many specimens of *affinis* and *mundella* flying together and found three pairs *in cop.* He also mentions that *mundella* has yellow palpi. It would be intensely interesting to examine one of these pairs. Perhaps some of our English collectors will be on the look-out when visiting sandhills. Then we have the so-called var. *portlandicella* Rich., which Meyrick and Staudinger have made a synonym of *Gelechia mundella* Dougl. The original type-specimens in the Dorset County Museum have by the kindness of Lieut.-Col. Charles G. Drew, D.S.O., enabled Mr. H. Stringer to examine the genitalia; also we have through the courtesy of the authorities of the British Museum examined specimens from the Bankes Collection, and we find the genitalia are quite distinct from the other species, therefore *portlandicella* Rich. must be reinstated in our collections as a good species. The description given by Mr. Richardson in the *Ent. Mo. Mag.*, 1890, p. 29, holds good. This is the description of the genitalia: Gnathos very curved; sides almost parallel, gently tapering to a point. Ostium plate rather narrow. Signum with points set wide apart above and close together below.

MICROLEPIDOPTERA FROM IRELAND.

BY BRYAN P. BEIRNE.

(Continued from p 197.)

TINEINA.

Gelechiidae.—*Paltodora cytisella* Curt.: Cahirnane, Cloghereen and Muckcross, Killarney. Recorded from Killarney (Kane). *Telephusa humeralis* Z.: Cahirnane. *Gelechia domestica* Hw.: Seapoint; Cahirnane and Flesk, Killarney. *G. umbrosella* Z.: North Bull, co. Dublin, abundant. *G. terrella* Z.: cos. Dublin, Wicklow and Wexford, common; Killarney. *G. dyffinis* Hw.: Seapoint. Recorded from Howth (Kane). *G. mulinella* Z.: Seapoint; Glen o' Downs; Flesk and Cahirnane. *G. soroculella* Hb. Killarney district, common; Seapoint. Recorded from co. Cork (Kane). *Phthorimaea costella* Westw.: Seapoint, frequent at light; Flesk, Killarney. Not previously recorded from Ireland. *P. tricolorella* Hw.: Glen o' Downs. *P. marmorea* Hw.: North Bull; Curracloe, co. Wexford, abundant. *P. leucomelanella* Z.: Seapoint. *Stomopteryx sanguella* Stt.: King's River, at Lockstown bridge, co. Wicklow, one; Seapoint, several at light. Not previously recorded from Ireland. In England this interesting species is found in "Durham, local, perhaps overlooked" (Meyrick). *S. anthyllidella* Hb.: Seapoint. *Acompsia cinerella* Cl.: Flesk and Cahirnane, Killarney; King's River at Lockstown bridge. *Anarsia spartiella* Schrk.: Seapoint. Recorded from Howth (Kane). *Chelaria conscriptella* Hb. (*huebnerella* Dn.). cos. Wicklow and Wexford; Killarney; Kilkee Park, co. Kildare.

Cosmopterigidae.—*Chrysoclista rhamnella* Z.: Cahirnane and Muckcross, abundant. Not previously recorded from Ireland. This species will probably be found in many localities in the west, where its food-plant, *Rhamnus*, occurs. *C. atra* Hw.: Seapoint, very common at light. Recorded from Belfast (Kane). The form *vinolentella* Meyr. (*nec* H.-S.): Seapoint, eight at light; not previously recorded from Ireland. *C. aurifrontella* Hb.: Kilmacanogue marsh, co. Wicklow. *Mompha schrankella* Hb.: Cahirnane. Recorded from Enniskillen (Kane). *Mompha propinquella* Stt.: Cahirnane, Killarney; not previously recorded from Ireland. *Batrachedra praeangusta* Hw.: Seapoint; co. Wicklow; Killarney district, very common.

Blastobastidae.—*Blastobasis lignea* Wals.: In the National Museum, Dublin, there is a small collection of Lepidoptera made by Dr. J. Scharff containing eight specimens of this species taken at the Rocky Valley, co. Wicklow, on various dates between August

3rd and 19th, 1911, and one taken at Dundrum, co. Dublin, on July 9th, 1912. Also in the National Museum is a specimen taken at Bray, co. Wicklow, July, 1913, by R. E. Cusack, which had been labelled as a var. of *Endrosis lactella* by Durrant. I take *B. lignea* very commonly at light at Seapoint, co. Dublin, and I have also got it more or less commonly at the Glen o' Downs, Greystones and Powerscourt, co. Wicklow. It will probably be found in many other localities down the coast. This species is in all probability introduced. In England it was first found in 1917 in Lancashire, and has since been taken in several localities in the south. It is also found in Madeira and E. Australia (Meyrick). As it seems to have been fairly well established in Ireland in 1911 it may be that it was introduced into England from Ireland.

Oecophoridae.—*Dasycera sulphurella* Fb.: cos. Dublin and Wicklow, very common. *Endrosis lactella* Schiff.: cos. Dublin and Wicklow, common; Killarney. *Borkhausenia fuscescens* Hw.: Seapoint, abundant; Glen o' Downs and Enniskerry; Park and Curracloe, co. Wexford; Flesk, Cahirnane and Muckcross, Killarney. Recorded from Howth (Kane). *B. flavifrontella* Hb.: Deerpark, Powerscourt; not previously recorded from Ireland. *P. pseudo-pretella* Stt.: cos. Dublin, Wicklow and Wexford; Killarney, common. *Chimabache faqella* Fb.: Seapoint, Glenageary and Killiney, co. Dublin. *Carcina quercana* Fb.: cos. Dublin, Wicklow and Wexford; Killarney, common. *Depressaria heracliana* De G.: Seapoint; Devil's Glen, co. Wicklow; Fair Head, co. Antrim. *D. badiella* Hb.: Seapoint. [*D. ultimella* Stt.: "Probably"—Mr. Stringer, Newcastle marsh, co. Wicklow. Not previously recorded from Ireland.] *D. costosa* Hw.: Seapoint, common; Glenageary; the Scalp, co. Wicklow. *D. liturella* Schiff.: Sandymount, co. Dublin; Newcastle marsh, co. Wicklow; Muckcross, Cahirnane and Kenmare demesne, Killarney. *D. arcuella* Schiff.: Flesk, Killarney. *D. propinquella* Tr.: Seapoint; Greystones and Glen o' Downs. *D. appiana* Fb.: Seapoint; Greystones; Fair Head; Cahirnane; Curracloe. *D. purpurea* Hw.: Kilmacanogue marsh; *D. alstroemeriana* Cl.: Curracloe, co. Wexford. *D. yeatiana* Fb.: Seapoint.

Orneodidae.—*Orneodes heradactyla* L.: cos. Dublin, Wicklow and Wexford; Killarney, very common.

Heliozelidae.—*Heliozela sericiella* Hw.: The Quill, fairly common, and Devil's Glen, co. Wicklow. Not previously recorded from Ireland.

Heliodinidae.—*Pancalia leuvenhoekella* L.: Ballyteige Bay, Kilmore, co. Wexford, common; not previously recorded from Ireland. *P. latreillella* Curt. (*nodosella* Mann): Ballyteige, very common. The history of this interesting species in Ireland is as

follows: On May 14th, 1932, Mr. A. W. Stelfox, of the National Museum, Dublin, noticed a very common moth on the sandhills at Ballyteige Bay, Wexford. He captured a specimen, which was identified at the British Museum as *P. latreillella* Curt. On May 19th, 1934, he again visited the locality, with Mr. J. N. Halbert. The moths were again noticed commonly. Mr. Halbert took one specimen, which he gave to me and which subsequently proved to be *P. leuwenhoekella* L., the first Irish specimen. When I went down to Ballyteige, on May 22nd, 1936, I captured both species commonly in the hollows of the sandhills. *Latreillella* was the commoner of the two in the proportion of about three to one. The species do not seem to have been noticed elsewhere on the Irish coasts. They may occur on the extensive sandhills on the eastern coast of Wexford and Wicklow. In April and May, 1936, Mr. T. Bainbrigge Fletcher found *latreillella* commonly with *leuwenhoekella* in Gloucestershire. The first Irish specimens were taken prior to this. *Schreckensteiniella festuella* Hb.: Glen o' Downs; Killoughrunn forest; Killarney.

Glyphipterygidae. *Simathis fabriciana* L.: cos. Dublin, Wicklow and Wexford; Kilkee Park and Carton, co. Kildare; Killarney district; Ballygluney, co. Galway. *Glyphipteryx thrasonella* Sc.: cos. Dublin, Wicklow and Wexford; Killarney; Carton, co. Kildare. *G. fischeriella* Z.: Seapoint, Newcastle marsh, co. Wicklow; Killurin, co. Wexford.

Elachistidae.—*Elachista cinereopunctella* Hw.: Flesk, Killarney; not previously recorded from Ireland. *E. magnificella* Tgst.: Glen o' Downs, common, and the Scalp, co. Wicklow; not previously recorded from Ireland. *E. apicipunctella* Stt.: Kilruddery and the Quill, co. Wicklow. Recorded from the Glen o' Downs (Cusack). *E. albifrontella* Hb.: Glen o' Downs, common; Park and Killurin, Wexford. Recorded from the Bray district (Cusack). *E. luticomella* Z.: Glen o' Downs; Park, Wexford. *E. atricomella* Stt.: Seapoint, abundant; Flesk and Cahirnane, Killarney, very common; Glen o' Downs. Recorded from Sligo (Kane). *E. perplexella* Stt.: Seapoint. *E. nigrella* Hw.: Enniskerry, co. Wicklow. *E. obscurella* Stt.: Seapoint; Flesk, Cahirnane, Muckcross and Kenmare demesne, Killarney, common. Recorded from Belfast (Kane). *E. zonariella* Tgst.: Cahirnane, common, Muckcross and Flesk, Killarney. Recorded from Howth (Kane). *E. Rhynchosporaella* Stt.: Seapoint; Muckcross. *E. cygnipennella* Hb.: Seapoint, Killiney and Portrane, co. Dublin; Curracloe, co. Wexford; Kilmacanogue marsh, co. Wicklow.

Scythridae.—*Scythris grandipennis* Hw.: near Lough Crincaum; Killarney.

Hyponomeutidae.—*Argyresthia brockeella* Hb.: cos. Wicklow

and Wexford; Killarney; Kilkee Park and Carton, co. Kildare, common. *A. goedartella* L.: Similarly distributed and common. *A. sorbiella* Tr.: Glen o' Downs. Recorded from the Bray district (Cusack). *A. cornella* Fb.: Seapoint, Rathmines and Milltown, co. Dublin. Recorded from Sligo (Kane). *A. retinella* Z.: co. Wicklow; Killarney, common. *A. conjugella* Z.: Glen o' Downs, very common, and the Scalp. *A. ephippella* Fb.: Glen o' Downs; Cahirane; Kilkee Park. *A. nudella* Fb.: cos. Dublin and Wicklow, very common; Killarney, common, including whitish vars.; Kilkee Park. *A. albistria* Hw.: Glen o' Downs and Kilmacanogue marsh; Killarney district. *A. semitestacella* Curt.: Glen o' Downs, Cahirane and Muckross. *Zelleria hepariella* Stt.: Cahirane and Muckross, Killarney, common; Glen o' Downs, common, and Greystones, co. Wicklow; not previously recorded from Ireland, unless the single supposed specimen of the south European *Z. phyllyrella* Mill., taken at Renvyle, Connemara, is this species, as is very probable (Kane). Meyrick gives the locality as Killarney, evidently by mistake. *Swammerdamia pyrella* Vill.: Seapoint and Killiney; Park, Wexford; Powerscourt and Kilmacanogue marsh; Flesk and Cahirane. *S. caesiella* Hb.: Seapoint; Flesk, Muckross and Cahirane; Lockstown bridge and Glen o' Downs. *Prays curtisellus* Don.: Seapoint; Park and Killurin, Wexford; Glen o' Downs, Cahirane. The fuscous form at Seapoint (four) and Killurin (one). *Hyponomeuta plumbella* Schiff.: Cahirane, Killarney; not previously recorded from Ireland. *H. padella* L.: Seapoint; Cahirane. *H. cognatella* Hb.: Seapoint and Milltown; Flesk and Cahirane.

Coleophoridae. *Coleophora spissicornis* Hw.: Seapoint; Glen o' Downs. Recorded from Sligo (Kane). *C. fuscenella* Z.: cos. Dublin, Wicklow and Wexford; Killarney. *C. lutipennella* Z.: Seapoint and Killiney, Glen o' Downs and the Quill; Killoughrum forest, co. Wexford; Flesk, Claghareen, Cahirane and Muckross, Killarney; common; not previously recorded from Ireland. *C. caespitella* Z.: Seapoint and Killiney; Glen o' Downs and the Quill; Muckross, Upper lake and Cahirane.

(To be continued.)

LAPHYGMA EXIGUA AT WEYBRIDGE. - In this district three specimens of *Laphygma exigua* were taken, on July 24th and 31st. They were at first mistaken for small, dark specimens of *Caradrina quadripunctata*. - J. R. MESSENGER; Oakhill, Oatlands Drive, Weybridge, August 1st, 1938.

[It may be of interest to add that I noticed a fresh specimen of this species in my garage at Selsey in the second week of August this year.—N. D. RILEY.]

ON THE TYPES OF *ADELPHA* (LEP., NYMPHALIDAE) IN THE COLLECTION OF THE BRITISH MUSEUM.

BY ARTHUR HALL, F.R.E.S.

(Continued from p 211.)

A. erotia Hew.

Although one of the older species this has been more often misidentified and confused than any other. The figure in Godman and Salvin's *Biologia* represents *A. phylaca aethalia* Feld.; those in Staudinger's *Exotische Tagfalter* and in Seitz's *Grossschmetterlinge* respectively are both *A. delinita* Fruhst., whilst the forms grouped under *A. erotia* in the text of Seitz belong to at least three different species !

The true *erotia* Hew. is a large robust species completely identical with *permagna* Fruhst. It is widely distributed, but not common ; the figure in Seitz is good. *deleta* Fruhst. is a slightly different individual form and is known from Colombia, Venezuela and French Guiana.

The other forms mentioned in Seitz all belong to different species, but on the other hand, there is little doubt that *lerna* Hew. is the dimorphic and much commoner form of *erotia*. There is a little variation individually in this form, but *acolia* Feld., *archidona* Fruhst. and *leonina* Fruhst. may all be taken as synonyms. *caphira* Hew. seems to be a good subspecies or a different species very close to *lerna*.

It may be as well to note that Hewitson's type of *erotia* is not a female, but a male with a female body stuck on.

A. delinita Fruhst.

This common Colombian species is quite distinct from *A. erotia*, as is shown by the genitalia, as well as by its size and markings. The type is apparently the specimen figured in Seitz, the figures of *erotia* on the same plate also representing this species. Another Colombian specimen in the Fruhstorfer Collection was marked as the type of *tyrea* Fruhst., apparently an unpublished name.

albina Fruhst. may stand for the slightly different race from Peru and parts of Bolivia, but the type has an unusual amount of white at the inner margin of fore wings and is only matched by one other example in the long series in the British Museum. The type of *uta* Fruhst. from Bolivia has a rather different under-surface and may represent a local race from that district and parts

of the Upper Amazon, but the two Honduras specimens designated by Fruhstorfer as co-types belong to a Central American race, which may be called *utina* subsp. nov.; the yellow band of fore wings is narrower and paler, posteriorly whitish and the underside resembles *delinita* rather than *uta*. Type in the British Museum.

A. malea Feld.

I have already published a note on this interesting species in *Novitates Zoologicae*, 1933, 39 : 11. It may be added that *heraclea* Feld. extends its range to Nicaragua, whence there is a specimen from the Godman and Salvin Collection.

A. fugela Fruhst.

This form or species certainly has nothing to do with *A. erotia*, but may be another race of *A. malea*, as it is very similar to *A. malea heraclea*. The type is a female from Obydos and the National Collection also contains a male from the same locality, one from Iquitos, two from Matto Grosso and single females from Villa Nova and Bahia.

A. jordani Fruhst.

ernestina Fruhst. is a good, but rather weak, subspecies, some Bolivian specimens agreeing better with the typical race.

A. crymanthis G. & S.

The form described as *adstricta* Fruhst. from Colombia is not in the Fruhstorfer Collection and is unknown to me.

A. velia Feld.

The types of *velhada* Fruhst. from Rio Janeiro and Blumenau show no tangible differences from typical *velia*, which is in the British Museum from Pebas.

A. phliassa Godt.

It is not quite clear why Fruhstorfer treated *A. phliassa* Godt. and *A. plesauze* Hubn. as different species, since his collection contained a good series of intermediate forms. Typical *phliassa* ranges from the Guianas throughout the whole of the Amazonian region to Bolivia and Colombia. *euboea* Feld. is an individual form with more whitish scaling on the inner margin of fore wings, and *implicata* Fruhst. from Peru and *sirona* Fruhst. from Bolivia are pure synonyms. Specimens from Matto Grosso are like *euboea* above, but usually have the suffused markings of the underside characteristic of *plesauze*, so that *bartolme* Fruhst., to which

cerachates Fruhst. is in any case synonym, may stand for the name of this intermediate form.

antoniae Frusht. and *heredia* Fruhst. are shown by the types to be synonyms to *plesaure*. *symona* Kaye from Trinidad is a good subspecies.

A remarkable form, which has come to the Museum from the Joicey Collection, may be called **pseudomalea** subsp. nov. In this the yellow band of the fore wings is broader anteriorly than in *phliassa* and without whitish scaling posteriorly; the white band of the hind wings is very narrow, but is bordered distally by a broad, not very sharply defined band of pale yellow; underside with the usual markings, but the ground-colour unusually yellowish. Type, one female from Muchuchachi, Venezuela, in the British Museum. This form is analogous to *A. malea malea* Feld. and *A. cytherea nahua* Grose-Smith.

A. cytherea L.

Most of the forms given in Seitz are sound, but *herennia* Fruhst. is synonym to *aea* Feld. *wernickei* Rüb. is synonym to *nahua* Grose-Smith, misprinted *nahua* in Seitz.

A. thoasa Hew.

manlia Fruhst. type from Bolivia is a good subspecies, but *zalma* Fruhst. from Peru is synonym to it. The type of *cuyaba* Fruhst. hardly seems to differ from typical *thoasa*, whilst *silva* Fruhst. seems, from the figure, to be the same thing, but the type is not in the Fruhstorfer Collection or else is not marked as such.

A. iphiela L.

The fourteen names which have been given to this common species do not seem to represent more than four subspecies. The type of *massilides* Fruhst. is only a large female of the Central American race *basuloides* Bates and *massilia* Feld. has nothing to do with this species at all, but is a form of *A. celerio* Bates.

Typical *iphiela* occurs throughout the northern half of South America and to it I regard *gortyna* Fruhst. from Colombia and *pharaë* Fruhst. from Peru as synonyms. With it, however, there occur specimens with unusually broad white bands, generally of small size. The oldest name for this broad-banded form seems to be *phera* Fruhst. A similar specimen in the Tring Museum is marked as the type of *exanima* Fruhst., but a specimen in the British Museum also labelled as the type of *exanima* is almost typical *iphiela*. Another synonym is *leucates* Fruhst., whilst *daceleia* Fruhst. from Trinidad is another hardly separable form, many specimens from that island being typical *iphiela*.

ephesa Mén. is the race from Central and S. Brazil and to this *gellia* Fruhst. and *abylina* Fruhst. are synonyms. *iphimedia* Fruhst. from Cuba is a good subspecies and it is probable that *abylla* Hew. from Jamaica is only another race of *iphicla* in spite of the rather peculiar shape of the hind wings.

(To be continued)

NOTES AND OBSERVATIONS.

EUCHLOE CARDAMINES IN AUGUST.—It may be of interest to record a capture of a male *E. cardamines* during the first week of August this year at Cheddar, Somerset. It was sent to me by a friend on the 9th and was probably caught a few days before. I do not know whether a second brood has been recorded before. Apparently this was the only one.—G. H. W. CRUTTWELL; Frome, August 23rd, 1938.

VANESSA CARDUI IN MARCH.—As I was sitting in the drive in my garden with a basket beside me two days ago (March 23rd), a *cardui* settled twice on my basket and once on the grass. Our usual time for seeing them is quite a month later. *Vanessa atalanta* was already out, but it hibernates here and may be seen in February on any sunny day. Miss K. M. HINCHLIFF, Worlington House, Instow, N. Devon.

VANESSA ATALANTA L. IN GLOUCESTER CITY.—On May 30th, 1938, a large Red Admiral, apparently an immigrant, was seen in a neighbour's garden in this road. This was the first specimen of this species ever seen by me in this city in May. My earliest recollection of it was chasing what I thought were hibernated specimens in May on the top of Robinswood Hill (600 ft.), about two miles outside the city. This gives me the impression that these immigrants frequent the hill tops, and do not, as a rule, descend into the valleys. On July 13th a fine fresh specimen appeared in my garden sunning itself on the dahlias and veronica flowers. This is by far my earliest date for it, and seems to me exceptional.—C. GRANVILLE CLUTTERBUCK; 23, Heathville Road, Gloucester.

ARASCHNIA LEVANA F. PRORSA IN CENTRAL FRANCE.—While staying near Tours at the end of July, 1938, I was very glad to see again and capture this species, which I was the first to discover in this district in 1923 (*vide Entom* 59 [1926] . 107).—C. G. M. DE WORMS; Milton Park, Egham.

LYCAENA PHLAEAS VAR. RADIATA.—During a sunny spell last October I took in this neighbourhood a male of the above variety, and to-day also in this locality I had the good fortune to take a female of this variety also. —B. HAROLD SMITH; Casa, Frensham Vale, Lower Bourne, Farnham, Surrey, August 16th. 1938.

DANAUS PLEXIPPUS IN THE SCILLY ISLES.—At 4.40 p.m. on August 15th, while standing on the quay at Porth Conger, St. Agnes, Isles of Scilly, I saw a *Danaus plexippus* fly across in front of me about three yards away. It was going at a fairly fast speed, but there could be no possible doubt as to its identity. Although I chased it, it went over a wall some fifty yards away from my first position and could not be found again. The day had been fine with a moderate north-west wind, against which the insect was flying, but some patches of fog had just come up. —E. BOLTON KING; 7, Keble Road, Oxford.

LIMENITIS CAMILLA IN HERTS.—I am pleased to record the appearance again of *Limenitis camilla* in the same spot near Hatfield where I found it last year, one only on July 26th. A fair number of *Polygonia c-album* have been observed, and *Strymon w-album* has been abundant feeding on thistle bloom. —LAURENCE S. HUDSON; Littlestowe, Essendon, Herts, August 10th, 1938.

GYNANDROMORPH OF LYSANDRA CORIDON.—While collecting to-day on the Downs between Petersfield and Winchester I took a fine gynandromorphous *Lysandra corydon*. Both wings on the right side are pure female, the left being pure male, and the division between the two sexes divides the thorax and body into two halves. Altogether an amazing specimen. There have also been a number of *Colias croceus* flying about on the same ground for the last three weeks, and to-day I took an example of the var. ♀ *helice*. B. HAROLD SMITH; Casa, Frensham Vale, Lower Bourne, Farnham, Surrey.

COLIAS CROCEUS AND LIMENITIS CAMILLA IN THE LONDON AREA. On August 1st, whilst umpiring a lawn tennis match on the grounds of the Highgate L.T.C., I was surprised at seeing a fresh male *Colias croceus* fly across the court just in front of me. On the same day I hear on the good authority of Mr. Geoffrey Cole that a specimen was seen in Hyde Park. On the previous day my son, while riding near Ambreshury Banks in Epping Forest, saw two specimens of *Limenitis camilla*—not the same specimen twice, as both were seen at once, settled on a bramble close to the horse's head. It will be very interesting if *camilla* re-establishes itself in one of its old haunts of Henry Doubleday's time. On Saturday last, August 6th, I saw two specimens of *Nomophila noctuella* on the junior playing-field of Highgate School a further indication of a good migrant year. —RUSSELL JAMES, F.R.E.S.; Lynton House, Bishopswood Road, Highgate.

APATURA IRIS AND LAPHYGMA EXIGUA IN SURREY.—A female *A. iris* was found entangled in a spider's web in a shed here on July 22nd last. I believe this is the first record of this species in this neighbourhood. I took in my light-trap at this address one *L. exigua* on July 31st and two more on August 1st last, all in perfect condition, and the appearance of this insect in my garden again

this year, after its appearance at approximately the same time last year, seems to suggest that it has succeeded in breeding here.--HENRY B. LAWSON; Churchmead, Pirbright, Surrey, August 6th, 1938.

ORIA MUSCULOSA IN BUCKS. -I took a specimen of this rare immigrant at light at Eton College on July 24th of this year. The moth is in excellent condition, and it seems very improbable that it has bred outside this country.--E. C. PELHAM-CLINTON; Trebles Holford, Bishops Lydeard, nr. Taunton, Somerset, August 13th, 1938.

CARADRINA EXIGUA AT EGHAM, SURREY, AND IN THE NEW FOREST. I think it of interest to report my capture here at sugar on September 20th, 1938, of two very fresh examples of this migrant species. Its presence inland is always of note, though large numbers have been appearing along the south coast since early August, when I also took (on the 6th of that month) a fresh male in the hotel I was staying at in Brockenhurst. -C. G. M. DE WORMS.

OEONISTIS QUADRA L. : IS IT A MIGRANT ?—*Ennomos autumnaria* Wb. and *E. quercinaria* Hf. were placed in the List of Immigrant Insects for Recording as resident species which may be reinforced by immigration, originally, on the ground that H. Gaetke (1891) recorded westerly flights in large numbers from Heligoland Lighthouse accompanying Larks, Plovers and Sandpipers with *Hybernia defoliaria* (l. on various dates October 25th, 1872; October 11th, 1883 and on July 29th, 1873, thousands of *E. quercinaria* also included hundreds of *Oeonistis quadra* L. As no evidence of immigration in the British Isles was recorded, the Thorns were removed from the list, Class (B), and information was asked for in the *Entomologist*, 69 : 282 as to the latter. It has now been decided to include *O. quadra* in the list of vagrants for observation, Class (c), as on August 4th, 1938, six specimens, coming from a westerly direction, settled on board the "Sunk" Light Vessel, situated ten miles S.E. of Felixstowe. A male was taken in good condition. The Essex recorder reports the species not common in Eastern counties, but may have been blown out to sea in the light west wind. (Capt.) T. DANNREUTHER, R.N. . "Windycroft", Hastings.

DANAUS PLEXIPPUS L. TAKEN IN TASMANIA.- The gradual spread of the Milkweed, *Asclepias* sp., from South Australia to Tasmania recently, resulting in *Danaus plexippus* becoming the commonest butterfly in South Australia, caused a look-out to be kept for the butterfly further south. Mr. D. Colbron Pearse, Secretary of the Tasmanian Biological Survey at Hobart, now reports having received a good male specimen taken by Mrs. H. W. Hodges at Launceston, Tasmania, on April 18th, 1938, in a garden. This is the first appearance recorded so far south.--Per (Capt.) T. DANNREUTHER, R.N. ; "Windycroft", Hastings.

HYLOICUS PINASTRI IN BOURNEMOUTH.—Over fifty years ago I saw a specimen of *H. pinastri* taken among tall pines in the middle of Bournemouth, so on coming to live here in 1924, I kept a look-out for the moth, quite unsuccessfully until the stormy opening of the present July, when I secured a male on the 7th, and a female on the 10th. Both were found sheltering at the base of tall trees following gusty nights, and I now wonder if the moth is not really commoner with us than has been imagined, but that in normal seasons it possibly rests far up out of sight. Arduous trudges to lone pines on the heaths of East Dorset in 1937 only produced one cripple.—W. J. MANSFIELD; 5, Chigwell Road, Bournemouth, July 16th, 1938.

DEILEPHILA GALII IN SURREY.—On July 14th, 1938, at about 10.15 p.m., a specimen of the Bedstraw Hawk—*Deilephila* (*Celerio*) *galii*—fresh and perfect in every detail, came to a light in a bedroom in this house and was easily captured. —HENRY B. LAWSON, Churchmead, Pirbright, Surrey.

A BITER BIT.—Our first outing on the Isle of Rhum this year was directed to the Kilmory Sand-dunes to study the flora and to determine whether *Nyssia zonaria* and certain other insects were to be found there. Our way took us up Kinloch Glen and we spent the journey in catching Odonata and other insect groups. One specimen of *Cordulegaster annulatus* attracted our attention as it darted by on account of its curious "forward" dip. Moreover, the head presented an unusual metallic gleam which caused the insect's capture. It is easy to imagine our surprise on discovering that it was carrying in its jaws a Tiger Beetle (*Cicindela campestris*), from which the elytra and wings had been neatly removed. —J. W. HESLOP HARRISON; King's College Biological Expedition, Isle of Rhum.

POLLINATION OF A RARE ALPINE PLANT BY A CARABID BEETLE.—Among Alpine flowers collected on Barkeval, Island of Rhum, were very conspicuous tufts of the Mossy Cyphel (*Cherleria sedoides*) with green flowers turned up to the sky and in very great numbers, all reaching about the same height. The flowers are flat and open, with ten widely-spaced stamens standing out round the pistil, and between every pair of stamens is a club-shaped nectary. The large black beetle, *Carabus monilis*, was observed crawling over the tussocks, and a closer observation revealed the astonishing fact that this large lumbering beetle was collecting the nectar from flower to flower, as could be seen by an opening and closing of the mandibles as they dipped into the flower. The beetle was nearly an inch long and the total diameter of the flower about $\frac{1}{4}$ of an inch, so a considerable nicety of movement was required by the insect in its journeys over the cushions of the plant.—KATHLEEN B. BLACKBURN; King's College, Newcastle upon Tyne.

DICONDYLUS BICOLOR HAL. IN DUMFRIESSHIRE.—Last year I had the good fortune to capture two specimens, both females, of this pretty Dryinid, and it is sufficiently rare to merit a record. My first

example was taken on the railway bank near Gretna while beating Yarrow for a certain weevil. This was on September 1st. The second occurred in hedge cuttings by the roadside on the road from Gretna to Corrie's Mill on the 16th of the same month. It is recorded from several localities in Southern England and from near Edinburgh by the late W. Evans. Dr. Richards, who has seen one of my specimens, tells me that the late P. Cameron got males of this species in Scotland, but further north than here.—JAS. MURRAY; 6, Burnside Road, Gretna.

BUMBLE-BEES DENUDED BY BEES. -The account of the *Acherontia atropos* found dead in a hive with its wings devoid of scales reminds me that a brother of mine found this year two large humble-bees, dead, in a hive, and in both cases they had been entirely denuded of hairs, and of the wings and tarsi also. What object can the bees have in doing this? The shining black body of the bee looked so different from one in its ordinary condition that it was at first mistaken for some strange beetle.—C. I. PATON; "Ormley", 7, Cavendish Road, Sutton, Surrey.

RECENT LITERATURE.

Mosquitoes of the Ethiopian Region. By A. M. EVANS. Part II: Anophelini adults and early stages. London: Trustees of the British Museum, 1938.

Have you ever noticed how much general interest there is in some highly specialized books and papers? Here is an immensely serious standard monograph on the sixty odd Ethiopian species of one genus of Diptera (*Anopheles*). It deals with such abstruse, apparently dull things as the "internal" taxonomy (*i. e.* groups and sub-groups within the genus), and structural differences (only to be dissected by expert hands and seen by expert eyes) in pharynx or hypopygium, or larval bristles. Surely the book's public can be no more than a dozen specialists? And yet it is full of things of surprising general interest. It contains the description of a few species (*A. concolor*), recently found in the Belgian Congo, but showing clear affinities with the European *A. maculipennis*, and representing a group not previously found in Tropical Africa. And that sets one wondering what next may be found, and what movements and exterminations of species could account for this isolated anomaly. Then there is the puzzling group of *A. funestus* and its immediate kin. Ten years ago we recognized one species, with an immense distribution and a tendency to vary. Then a lack of uniformity in the structure of larvae and eggs was observed, though adults seemed indistinguishable, and named "varieties" were described. Very speedily more and more points of difference were found as detailed specialist work was carried out. Now most of them are reckoned to be species, and small but constant differences between their adults have been

detected. Very often, too, some apparently trivial character (a little feathering on a particular hair of the larva, or some minute spot on the adult's wing) is the outward and visible sign of an inward and physiological difference; the two species thus separated may breed in different waters, seek blood from different hosts, and be utterly different as carriers of malaria. Could one conclude that the more we know of a minute part of nature, the more things of general interest we may find?—P. A. BUXTON.

SOCIETIES.

ENTOMOLOGICAL CLUB. —A meeting was held on July 21st, 1938, at "Woodhouse". Stroud, Dr. Harry Eltringham in the Chair. *Members present* in addition to the Chairman: Mr. H. Willoughby Ellis, Mr. Jas. E. Collin, Mr. W. Rait-Smith. *Visitors present*: Prof. G. D. Hale Carpenter, Mr. T. Bambridge Fletcher, Mr. H. W. Holloway, Dr. Sheffield Neave, Sir Edward B. Poulton, Mr. Austin Richardson, Mr. C. J. Wainwright. The guests arrived during the morning in time to enjoy the gardens, which, notwithstanding the inclement season, presented a gay scheme of colour. Luncheon was served at 1 o'clock, the items on the menu being enumerated in the Chairman's special Latin. The humour of these "original descriptions" greatly amused the gathering. After luncheon Sir Edward Poulton said that his friend Canon St. Aubyn Rogers had taken advantage of the air-mail to send him, on July 4th last, five living pupae of *Papilio dardanus*, together with their female parent of the form *cenea*. The box arrived about July 12th, and as the Hope Department was unusually cold for the time of year, Prof. Hale Carpenter had taken them to warmer quarters in his house. That very morning he found that the first of these had most tactfully emerged overnight so as to be ready to appear at the Club Meeting. It was a female of the form *hippocoon*, and was the first living specimen of *dardanus* to be seen in England. Its behaviour was most ingratiating, fanning its wings not violently, but just so that the members and their friends could see the pattern favourably. After luncheon a meeting of the Club was held, during which Dr. Sheffield Neave and Dr. Richard Armstrong were elected members of the Club. The Chairman's very complete and interesting laboratory and some of his current work attracted many of the company. During the afternoon, in delightfully fine and warm weather, excursions were arranged through the adjacent beautiful Cotswold country, where the panorama of the valley of the Severn and the estuary of the river in the far distance were clearly seen and much admired.

The visitors who could not remain left before dinner; those who were able to stay the night were entertained by Dr. and Miss Eltringham and left during the next morning.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).

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PYRAUSTA NUBILALIS HÜBNER (LEP., PYRALIDÆ) IN SOUTH ESSEX.

By H. C. HUGGINS.

At a field meeting of the South London Entomological and Natural History Society on July 10th Mr. S. Wakely showed me a moth he had taken earlier in the day in the Benfleet district, which he believed to be a female *P. hyalinalis*. I saw at once that it was an insect with which I was unacquainted and told him I believed it to be a specimen of *P. nubilalis* Hübner.

Mr. Wakely told me where the moth was captured and a few days later I visited the place and discovered several specimens. In all, I saw just over a dozen specimens, belonging evidently to a brood hatched in this country and also equally clearly the progeny of one immigrant female, as they were highly localized in their distribution.

I was unfortunately rather too late for the moths, most of which appeared to have emerged about a week earlier, but I succeeded in taking two newly-emerged and quite perfect specimens, a female, and a magnificent dark male. I kept one female for eggs and succeeded in obtaining a batch. As the most suitable foods for the caterpillars are various growing cereals I sent these to Mr. J. C. F. Fryer to rear. The eggs were thickly laid in an oval mass and Mr. Fryer reports that 40% of these duly hatched and the larvae were being fed on growing maize plants. Mr. Fryer tells me that it is well known abroad that only a low percentage of the eggs of *nubilalis* hatch, the observed proportion being 30-70%. In the case of my eggs only those round the edge of the egg-mass emerged.

I wrote and told Mr. Wakely of my captures and he visited the place shortly after, with Mr. L. T. Ford, and succeeded in netting a female, from which Mr. Ford obtained ova. As Mr. Wakely's original female also laid there is a chance of a few British-reared specimens being obtained.

In the Mediterranean districts *P. nubilalis* feeds chiefly on maize, millet, and rye, but in Northern France it eats mugwort and hop, in all cases feeding within the stem. I think that there is little doubt that our local brood fed on mugwort as several of my specimens were dislodged from this plant.

Although *P. nubilalis* has to-day an almost cosmopolitan distribution and is a serious pest in the United States, where it damages the maize crops and is known as the European corn-borer,

it has been very rarely found in this country, and then only in small numbers, appearing to be only a casual immigrant. No previous records suggest its having emerged in this country, except a group in the Isle of Wight in the middle fifties, which give the impression that it was established there for a few years.

Through the kindness of Mr. H. M. Edelsten I am able to give what appears to be the complete record of former captures.

Durham.—One by J. Gardner at Hartlepool, June, 1891, exhibited by B. A. Bower at Ent. Soc. London (*Entom.*, 1891, **34** : 305).

Suffolk.—One by A. E. Gibbs at Felixstowe, 1903, form *silacealis* (C. G. Barrett, *Ent. Mo. Mag.*, new series, vol. xv, April, 1904).

Kent.—One near Deal, June 21st, 1936, H. C. Gunton (Dannreuther, *Entom.*, 1937, **70** : 8).

Sussex.—One, Cliff Down, Lewes, June 21st, 1936, C. O. Ridley (Dannreuther, *loc. cit.*).

Hampshire, Isle of Wight.—Two at Sandown, July 6th, 1853, Rev. P. H. Newnham, confirmed by Stainton (Barrett, *Lepidoptera of Brit. Isles*, **9** : 185). One at Bembridge, 1857, Dr. A. Wallace, in the Dale Collection (Commander J. J. Walker, *Ent. Mo. Mag.*, 2nd series, vol. xxi, Aug., 1910). Three at Sandown, 1857 Dr. Wallace, in the Bankes Collection (E. A. C. Stowell, *Entom.*, 1934, **67** : 259. Three at Sandown, 1856 : 20, Sandown, June, 1857/8 at light, "in early lists" (Stowell, *loc. cit.*).

I possess five specimens from Nevinson's Collection labelled in his writing "Dr. A. Wallace's sale, 1887", which were probably part of these captures.

Two at Ventnor, undated, in Mason Collection, Mr. Luck (Stowell, *loc. cit.*). One at light in Isle of Wight, July 6th, 1934.

Dorset.—Two at light at Studland, July, 1934 (Sir Beckwith Whitehouse, *Entom.*, 1935, **68** : 147).

Glamorgan.—One at Castell Coch, June 23rd, 1931 (W. E. Cox, *Entom.*, 1932, **65** : 80).

London.—One on a shop window in Peckham, S. London, July 9th, 1874 (*Ent. Mo. Mag.*, 1875, **11** : 256; *Entom.*, 1877, **10** : 91).

In addition, Barrett mentions specimens of British origin in Doubleday's Collection and gives Manchester and Padstow as localities, and S. J. Capper (*Ent. Rec.*, 1892, **3**) records taking one in 1891, but gives no locality. I should guess this was another Isle of Wight specimen, as Capper did much collecting there.

I am greatly indebted to my friends, Messrs. H. M. Edelsten and J. C. F. Fryer for collating previous records and for information concerning the habits of *P. nubilalis* abroad respectively.

NOTES ON DRAGONFLIES IN 1937.

By H. G. ATTLEE.

FOUR teneral *Pyrrhosoma nymphula* Sulz. on April 25th at Hastings were my earliest recorded dragonflies. This species was probably seen on May 3rd at Byfleet, where on May 12th were also seen *Brachytron pratense* Müll. (naiad-skin); *Cordulia aenea* Linn. (naiad-skin and immature female); *Coenagrion pulchellum* Lind. (immature female); and *Ischnura elegans* Lind. (*rufescens* female just emerged).

Some six *Libellula quadrimaculata* Linn. were just out by 4 p.m., May 14th, at Esher Common—one was reported from Thursley the day before. Three females of *Coenagrion puella* Linn. had just emerged, 11 a.m., May 16th, Hastings; one was almost mature-coloured by 1.30 p.m.; *B. pratense* was on the wing at Hastings. Search for *Enallagma cyathigerum* Charp. at Esher Common, May 18th, yielded one naiad-skin; none was seen at Thursley two days before. On May 21st the first yellow male *Libellula depressa* Linn. was seen by Byfleet canal, besides a few *C. pulchellum*, many *P. nymphula*, and other common species. Two teneral males of *Agrion virgo* Linn. appeared at Crowhurst, Sussex, on May 23rd; next day two males and three females of *Erythromma najas* Hans. were out near Weybridge, and as many of *Agrion splendens* Harr., with several teneral specimens. The New Forest on May 25th produced some twelve *Gomphus vulgatissimus* Linn., with *P. nymphula* (many), *A. virgo* (3 or 4), *C. puella* (1), and one immature *Orthetrum coerulescens* Fabr. flying well at this unusual date! On May 26th some twelve *Platycnemis pennipes* Pall. appeared about the Wey and a pond close by, in teneral state; on 27th, near Tunbridge Wells, a female *Cordulegaster boltonii* Don. had just emerged (11.20 a.m.), and after 20 minutes it began wing-quivering, when one wing became clogged on the stream-bank; when released it flew in a few seconds to a distant tree. *C. puella* and *L. depressa* were ovipositing here, but the very abundant *E. cyathigerum* was not seen yet, and only one or two at Byfleet on 28th, where *Somatochlora metallica* Lind., a male, was first seen, just emerged on the canal-bank; on 29th *B. pratense* and *L. quadrimaculata* oviposited. The first *Anax imperator* Leach, not in full colour, flew over a pond for a few minutes on May 30th, Hastings.

A trip to Hickling, May 31st, showed *Libellula fulva* Müll. in numbers, though no blue male was seen; the swarms of *E. cyathigerum* were almost entirely teneral here. Next morning,

among the *pratense*, etc., hawking about and resting in a sheltered corner, I put up two great insects which could only be *Aeshna isosceles* Müll., which had almost certainly been hawking round these bushes the evening before.* Among the usual species I saw a pair of *C. aenea* here for the first time. In the dusk (9.30 p.m.) single specimens of *naias*, *quadrимaculata* and *fulva* were resting on reeds close to the foot-track.

An almost certain *Orthetrum cancellatum* Linn. left a dry earth-patch characteristically; it was only seen for certain, two males and a female, in Richmond Park on June 7th, when thirteen specimens of *A. imperator* were seen emerging, besides two on wing. A male *pulchellum* was seen at Hastings with aberrant markings on the 4th and 8th segments. On June 9th a female *A. virgo* was seen at Ryfleet canal (I have once seen a male there)—an addition to the list in *Entom.*, 71 : 84; during this month I added *E. naias* and *O. cancellatum* to my list for Hastings, both from Bulverhythe marsh: the latter was noticed often on floating wood, almost touching the water. Several teneral *Palaeobasus tenella* Vill. were out on Thursley Common on June 11th, with many *O. coerulescens*. On June 30th an empty skin of *Aeshna cyanea* Müll. was found near Esher Common, and a teneral *Aeshna grandis* Linn. was sunning at the same pool; close by an immature *Sympetrum sanguineum* Müll. was seen on July 2nd. At the Black Pond about a dozen teneral *Sympetrum danae* Sulz. were out on July 3rd, while two were reported at Thursley the day before. *Sympetrum striolatum* Charp. was not noticed till July 7th, and then in teneral state only. On July 11th a female *S. sanguineum* was ovipositing on *Poa fluitans*, first coupled to the male, later unattached, seeming to touch the leaves at 1½-2 ft. above the dyke-bank.

The first *Aeshna juncea* Linn. was seen near Godalming on July 14th; *Ae. cyanea*, *S. danae* (many), *S. striolatum* (few) and 14 other species being seen about the commons. On August 2nd *P. nymphula* (three at least) was still on wing in the same locality. Two males of *C. aenea* survived till August 6th near Tunbridge Wells; the last *L. quadrимaculata* was seen at Esher Common on the same date.

Aeshna mixta Latr. was first seen near Tunbridge Wells on August 2nd. A dark-bluish female *L. depressa*, was watched at Hastings on August 17th, making only very few short flights during more than half-an-hour. Two hours of brilliant sun at Hickling on August 18th showed the following still on wing: *C.*

* I may add that I examined a female *Ae. isosceles*, in this late and (for Norfolk) disastrous season (1938) on June 4th, which was strong on the wing on the 6th.

pulchellum, male; *L. fulva*, a ragged-winged almost black female, with dorsal stripe just perceptible, and possibly a blue male also; *Ae. isosceles*, one or two almost certainly on wing (from their proportionally larger thoraces compared with *grandis*, etc.); possibly one *L. quadrimaculata*; and several bluish-shaded females of *O. cancellatum*. Several specimens each of *Ae. juncea* and *Ae. mixta* were seen, and one male *S. sanguineum*. On 21st a male of *O. coerulescens* visited a sandy bank by the Byfleet canal.

Last dates for our later species were:

S. metallica (1), *C. puella* (female), August 23rd, near Tunbridge Wells.

P. pennipes (female), August 26th, Byfleet.

A. imperator (female ovipositing) August 29th, Hastings.

O. cancellatum (1), September 5th, Hastings.

P. tenella (pair); *O. coerulescens* (blackish female), September 7th, Godalming district.

I. elegans (1), September 20th, Kew; (1) September 22nd, near Tunbridge Wells.

C. boltonii (male), September 22nd (female), September 24th, near Tunbridge Wells.

L. sponsa (female), *E. naias* (male), *E. cyathigerum* (male), *Ae. grandis* (1), September 29th, Godalming district.

Ae. juncea (1), October 28th; *S. danae* (male), November 4th; *Ae. mixta*, November 5th, Esher.

Ae. cyanea (male hawking under pines in sun), November 7th, Hastings.

S. striolatum (male), November 8th, Esher.

In reference to my notes for 1936 (*Entom.*, 70 : 130), I have to cancel the reported *A. imperator* on September 3rd, as my informant mistook the species, and his record of *S. sanguineum* from Cutmill Ponds is uncertain.

4, Combermere Road,
St. Leonards-on-Sea.

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COLIAS CROCEUS, ETC., IN KENT.—*Colias croceus* has been extraordinarily common in this district this year. I have never before seen it in such numbers. I have also seen several *Colias hyale*. *Polygonia c-album* has also been in this neighbourhood in most unusual numbers. On April 13th we saw the earliest specimen of the year, and it has been with us in varying numbers ever since. Even yesterday, after several days of extremely stormy weather, there was one feasting most of the day on our Michaelmas Daisies. I was delighted also to find *Limnitis camilla* in a wood not far from here in August, as I had never seen it on the wing before outside the New Forest.—J. L. H. STISTED; The Firs, Rolvenden, Cranbrook, Kent, October 18th, 1938.

ON THE RACIAL VARIABILITY OF *EREBIA*
MELANCHOLICA H.-S.

BY B. C. S. WARREN, F.R.E.S.

IN Vol. 2 of the *Festschrift* in honour of Prof. Strand's sixtieth birthday, Mr. Sheljuzhko, in the course of an article on the collections he made in the Teberda district of the north-west Caucasus, gave an account of the *Erebia* from that district that has been referred to by Prof. Tshetverikov under the manuscript name of *Erebia prometheus*. Mr. Sheljuzhko deals with the possibility of *prometheus* being a species distinct from *melancholica* in that detailed manner which is characteristic of all his work. In view of this possibility he gives (*l. c.*, 2 : 332, 1937) a translation into German of the description drawn up by Tshetverikov, thus for the first time publishing the name. I have already dealt with this Caucasian insect in my monograph on the genus (p. 347) having had material from Mr. Sheljuzhko to compare with some of the older specimens I was able to borrow at that time. Since then, thanks to Mr. Sheljuzhko, I have obtained further material of recent origin. A careful comparison of these recent specimens with the four males and three females from older collections as well as with Herrich-Schäffer's figures and description, left no doubt in my mind that all were the same insect. Mr. Sheljuzhko raises the question whether the older specimens I had were not merely old specimens of *prometheus*, and not true *melancholica*, pointing out that the locality of typical *melancholica* was Mt. Ararat, and that all my specimens were supposed to come from the Caucasus with the exception of one male which was without any locality label. That objection, of course, is perfectly valid, but still I had not overlooked it. Herr O. Bang-Haas who supplied me with some Caucasian specimens, informed me that these were identical with the specimens from Ararat in the Staudinger Collection. Also, as I said before, I was satisfied that these modern Caucasian specimens agreed so closely with Herrich-Schäffer's figures and description, that they could by no possibility be attached to any other species than *melancholica*. However, the publication of Tshetverikov's description made it desirable to clear the question up as far as possible, and the only means of doing so was by an examination of some of the original specimens of *melancholica*.

Herrich-Schäffer's description was based on some eighty specimens taken by one Moritz Wagner and said to come from Asia Minor. Some few years later (1851) Nordman stated that the specimens came from Mt. Ararat, which must be taken as the

typical locality. There are probably a certain number of the original eighty specimens still in existence, but the only ones I have heard of are those in the Staudinger Collection. Herr Bang-Haas has now kindly lent me two males and permitted me to dissect them. Of these specimens one bears a label with "Ararat" in handwriting on it, the other, a small label with "v. W." printed on it. Both specimens are unmistakably of considerable age, and identical in appearance, preservation and setting. There is nothing to suggest that they were not both taken at the same date in the same locality, and I feel no doubt that both are from the original series and therefore syntypes as well as topotypes. What the letters "v. W." on the printed label stand for, is unknown; Herr Bang-Haas is unable to give me any explanation. It must be recalled that these specimens were lent to Elwes by Dr. Staudinger over forty years ago, when the latter told Elwes that they came from Lederer's Collection and were probably of the same origin as the type. At that date Elwes states that no fresh specimens had been obtained; *i. e.* since the original series. Two points concerning the small printed label are worth attention: first, the fact that it is printed; second, the letters themselves are suggestive; the "v" is a small and the "W" a capital letter. It is obvious that whoever put the label on was labelling a large number of specimens in a similar manner, otherwise two letters would certainly have been written by hand. It is therefore most likely that the letters indicate the name of the owner of the collection from which the specimens came, and the name of Fischer von Waldheim is thought most probable by Herr Bang-Haas and others whom he has consulted; unfortunately it is impossible to be certain. The supposition, however, is strongly supported by the fact of the first letter on the label, the "v", being a small one. If the specimens had been in the collection of von Waldheim it would follow that they must have come from the original series.

I have now dissected both these specimens and found that, in every detail, the formation of the genitalia is identical with the corresponding structures in those Caucasian specimens which I have described and figured in my monograph as *E. melancholica*. The Ararat specimens are (so far as I can ascertain without making an actual preparation of the scales) also without androconial scales; so that on anatomical grounds it is impossible to separate them from *prometheus*, and there does not appear to be the slightest ground for assuming them to be distinct species. I am even unable to detect any structural variability of a subspecific nature, such as often exists in subspecies of other *Erebia* species. Since the publication of my monograph I have dissected further specimens

from the Caucasus, all of this additional material confirms the details I gave then concerning the structural differences between *E. melancholica* and *E. neoridas* (*l. c.*, pp. 340 and 346). It also enables me to add that there exists one further slight difference between these species in the curvature of the brachia. I had noted this before but did not refer to it, as it is a character that is very easily obscured by distortion, and difficult to observe owing to the two brachia becoming superimposed in mounting, and the number of preparations I was previously able to make was insufficient to make absolutely certain of the point.

The ventral line of the brachia in *E. neoridas* is less curved than the dorsal, and in consequence there is a somewhat marked tapering in the width of these processes over their entire length. In *E. melancholica* the ventral line is almost as much curved as the dorsal, which results in a less obvious tapering in width, as well as the more marked appearance of the ventral curvature. These differences can be recognized in the figures on pl. 53 in my monograph.

Having therefore eliminated the possibility that *E. melancholica* and *prometheus* might be distinct species, there remains the question as to whether the latter constitutes a recognizable subspecies of the former. I stated previously (*l. c.*, p. 347) that this did not seem to be the case. In forming that opinion I was considering the possibility of separating all Caucasian specimens from typical *melancholica*. Since I have examined the two Staudinger syntypes I am still doubtful on this point. I have now a much longer series of *prometheus* than when I was dealing with the question for my monograph, and on comparing this series with the syntypes I think Mr. Sheljuzhko is justified in claiming *prometheus* to be a recognizable subspecies; but, apparently, it is not the only race of the species which occurs in the Caucasus.

It is now necessary to comment, briefly, on the characters which Tshetverikov gives in his description to distinguish *prometheus*:

(1) Size; *prometheus* being the larger. (2) The spots are placed at the outer edge of the rusty bands in *prometheus*; situated in the middle of the bands in *melancholica*. (3) The spots on the upperside of the hind wings in the male *prometheus* have large, white pupils, and are surrounded by broad, rusty rings; small white points in black rings only appear in *melancholica*, the rusty rings being wanting. (4) The underside of the hind wings in *prometheus* male a more or less uniform red-brown colour, the basal and marginal areas not contrasting; in *melancholica* male the basal area markedly darker. (5) The underside of the hind wings in *prometheus* without any spots.

Now, to consider these points in turn: (1) Size is not constant throughout the Caucasus, *vide* my monograph. pl. 96, figs. 1478,

1484, male, and 1479 and 1485, female. This pair are *smaller* than the measures Tshetverikov gives for *melancholica*; also smaller than the syntypes. My previous opinion that *prometheus* and *melancholica* could not be separated, was based on the assumption that normal *melancholica* as described by Herrich-Schäffer was something between these small examples and the other larger specimens I figured. If such were the case it would, of course, be impossible to define more than one race, so far as size is concerned, for the difference would be so slight, in some cases a little larger and in some a little smaller than normal, that it could not possibly be considered a constant racial character. (2) The position of the black spots: these in the two syntypes are exactly located as in *prometheus*, the apparent difference is caused by an increase in width of the band of the fore wings in the latter, which increase is very variable in extent. (3) There is no real difference in the character of these spots on the hind wings in the syntypes, *prometheus*, or any of the older Caucasian males I have seen. Of the twenty or so *prometheus* I have examined, not one had more than a very narrow, scarcely visible in some cases, rusty ring round the black spots; and Mr. Sheljuzhko notes that even this ring can sometimes be lost. (4) The coloration of the underside of the hind wings in the males is absolutely identical in the syntypes and all other males. (5) The two syntypes are likewise quite without black spots or white pupils on the underside of the hind wings. To these characters Mr. Sheljuzhko adds from his experience, that *prometheus* has broader wings, the bands on the upperside of the fore wings also broader and irregular in width; while on the underside of the hind wings of the male only slight traces occur of the white points which are so pronounced in Herrich-Schäffer's fig. 277. The character of the broader wings is marked in *prometheus*; but the bands of the fore wings are equally irregular in the syntypes, though narrower; it is instructive to note that the white points can occur on the underside of the hind wings in *prometheus*, but as already mentioned they do not appear in the syntypes, so their presence in *melancholica* can only be aberrational.

We therefore see that the only real differences which distinguish *prometheus* are: (1) The wings are broader; (2) the bands of the fore wings are also broader, spreading inwards (variable); (3) it is larger (? in some districts only); (4) it appears to me that the black spots are larger on the fore wings than in the syntypes. From this it is clear that these races are very close; also that the small pair I figured are transitional between *prometheus* and *melancholica*, though with much greater affinity to the latter. They have the size, shape and band-development of *melancholica*, but somewhat larger black spots approaching those of *prometheus*;

and they come from the Caucasus, exact locality unknown. The question naturally arises, do similar specimens occur with *melancholica* on Mt. Ararat? It is most probable, for they only differ in the size of the black spots and the size of such spots varies greatly in *prometheus*. That these transitional specimens are only a form of typical *melancholica* seems most probable, but if this is so then the latter must exist in the Caucasus, unless the labels are incorrect and the specimens really came from the original Ararat series. If, however, the transitional specimens should be found to occur with *prometheus*, the latter could not be maintained as a true subspecies for the variation in size of the black spots in *prometheus* is great, some individuals having these spots no larger than in the syntypes of *melancholica*. Should this reduction in the size of the spots occur in a transitional individual, it would be typical *melancholica* and the accompanying specimens of *prometheus* would be shown to be a form which has not yet entirely superseded typical *melancholica* in that area and therefore not constituting a true subspecies.

Until such time as we know more of the circumstances of the occurrence of the transitional specimens, it will remain impossible to decide the taxonomic value attaching to the characters which distinguish *prometheus* with certainty. The latter can, for the present, be retained as a subspecies of uncertain distribution. Mr. Sheljuzhko gives the following localities where he knows *prometheus* to occur. The Chatipara mountains; the Tzeja glacier district in the Central Caucasus; Kabz-Dag mountains (Dagestan); Rkiniz-Dzhvari (Grusien) and the Zekar Pass. To these I can add the one specimen I have from Borshom. Of the specimens figured in my monograph, all with the exception of the transitional pair (figs. 1478, 1479, 1484 and 1485) are *prometheus*.

In conclusion I must offer Herr O. Bang-Haas sincere thanks for permitting me to dissect the two Staudinger syntypes.

DEPRESSARIA NERVOSA IN THE OUTER HEBRIDES. -As is well known, this insect feeds on the Hemlock Water Dropwort (*Oenanthe crocata*), a plant not recorded in Druce's *Comital Flora* as occurring in the Outer Hebrides. However, during the past month we have discovered the plant in two localities on the Isle of South Uist, Loch Eynort and Loch Boisdale, as well as on the Isle of Eriskay. The Loch Boisdale colony has been attacked by large numbers of larvae of *Depressaria nervosa*. Some of these were still feeding on the seeds, but the majority occurred as pupae on the stems of the food-plant. — (Prof.) J. W. HESLOP HARRISON; King's College (University of Durham) Biological Expedition, Isle of South Uist.

AN ERGATANDROMORPH OF *MYRMICA LAEVINODIS* NYL., AND THE LIST OF GYNANDROMORPHS, ETC., BROUGHT UP TO DATE (HYM., FORMICIDAE).

BY HORACE DONISTHORPE, F.Z.S., F.R.E.S., ETC.

Myrmica laevinodis Nyl. Ergatandromorph.

Rather pale testaceous (probably immature) gaster and head darker, a thin black marking at anterior margin of mesonotum and towards the left of the same, also on the posterior border towards the right, the centre of the metanotum, and the left side of the epinotum (♂ tubercle); beneath the left sternite of mesothorax black, and the right posterior leg infusate.

Head in shape more that of ♂, not so long as in ♀, sculpture stronger than in ♂, but not so strong as in ♀; *mandibles, antennae* and *eyes* ♀; *ocelli* present, but smaller than in normal ♂. *Thorax* mostly ♀, but bearing four *wing-pads* of a membranous nature, no *Mayrian furrows* present but the left *parapsidal furrow* very distinct on mesonotum, which is much less sculptured than in ♀; the *prae-scutellum* is indicated on the right, *metanotum* present; *epinotum* armed on right side with ♀ spine, on left with ♂ tubercle; *petiole* and *post-petiole* ♂. *Gaster* more the shape of ♀, but with ♂ *genitalia* exposed (these are somewhat distorted and a slide would be necessary to describe them accurately), the right *stipes* is larger than the left, the *volsellae* can be traced, as also one *sagitta*. *Legs* ♀. *Long.* 4.4 mm.

Described from a specimen taken by Mr. Holger Holgersen in a small colony of *Myrmica laevinodis* Nyl., under a stone at Høiland. Royaland, Norway, on August 18th, 1938.

In my paper on Gynandromorphism in Ants [*Zool. Anzeiger* (Wasmann-Festband), pp. 92-96 (1929)] I compiled a list of all the cases known to me which had been described to that date, making a total of 49. From this list, however, I had omitted 6 cases, thus the total should have been 55. I now append these, as also those described since, which, including the present one, bring the total up to 63:

Iridomyrmex constrictus Mayr.

1868. Mayr, *Beit. Naturg. Preuss. Phys. ökon. Gesells. Königsberg*, 1: 102 (1868).

Cataglyphis albicans Rog. (2 specimens).

1921. Santschi, *Bull. Soc. Hist. Nat. Afrique Nord.*, 12: 76 (1921).

Myrmica ruginodis Nyl. (2 specimens).

1924. Emery, *Acad. Sci. Istit. Bologna [N.S.]*, 28: 82-89 (1924).

Cardiocondyla nuda minutior Forel.1926. Swezey, Pro. Hawaii. Ent. Soc., **6** : 229 (1926).*Formica nitidiventris* Emery.1928. Creighton, Psyche, **35** : 53 (1928).*Cardiocondyla wroughtoni* For. v. *hawaiiensis* For.1931. Wheeler, Psyche, **38** : 84 (1931).*Pheidole pallidula* Nyl.1931. Vandel, Bull. Biol. France Belg., **65** : 114-129 (1931).*Ponera coarctata pennsylvanica* Buckley (3 specimens).1931. Wheeler, Psyche, **38** : 82 (1931).*Myrmica sulcinodis* Nyl.1931. Santschi, Rev. Suisse Zool., **38** : 351 (1931).No. 63 = *Myrmica laevinodis* Nyl.

1938. Donisthorpe (described above).

British Museum (Nat. Hist.),
Cromwell Road, S W. 7.

HIBERNATED BUTTERFLIES. Owing to the most extraordinary early spring probably ever recorded unexpected butterflies have struck the public eye, and the Press has been full of records of "early" ones. But the reports of hibernated *Vanessa atalanta* and *V. cardui* are apparently sent in by people who know the species when they see them. Now although in these islands we have had summer temperatures in March, it has not been so on the Continent, and, moreover, the prevailing winds for the last three months have been persistently N.W., N., and E. Therefore, it seems perfectly clear that the *atalanta* and *cardui* were hibernated only, and that seems finally to settle the question, "Where do the Red Admirals and Painted Ladies go to in the winter?"

The *Nymphalis io* of this locality are interesting. After hibernating all the winter in my garage one went outside on March 4th. From that date on up to and including to-day the Peacocks have been in my garden on every sunny day. There are three that live on the property, and so far as I can see, never leave it. Each has its own part of the garden. During the very severe night frosts of last week they merely took cover for the night, in crannies of the old walls, I suspect, and were out and about again as soon as the day temperature rose sufficiently. On the other hand, early *Euchloe cardamines*, first seen on April 10th, were apparently cut down by the frosts, which have destroyed fruit blossom nearly as badly as in the great frost of May, 1935. —(Brig.-Gen.) J. B. G. TULLOCH; Hill Court, Abergavenny, April 24th, 1938.

MICROLEPIDOPTERA FROM IRELAND.

BY BRYAN P. BEIRNE.

(Concluded from p 231.)

Gracilariadae.—*Lithocolletis roboris* Z.: Devil's Glen, co. Wicklow. Recorded, without locality, from S. or S.W. Ireland (Mrs. Lucas). *L. cramerella* Fb.: The Quill, Powerscourt and Glen o' Downs; Cahirnane. *L. heegerella* Z.: Glen o' Downs; Cahirnane. Recorded from the Wicklow Mts. (Kane). *L. mesaniella* Z.: Seapoint, abundant. *L. quercifoliella* Z.: co. Wicklow; Killarney, very common. *L. almfoliella* Dup.: Glen o' Downs; Cahirnane. *L. scopariella* Z.: Cookstown River at Enniskerry, co. Wicklow. Not previously recorded from Ireland. *L. faginella* Z.: Glen o' Downs and Enniskerry; Cahirnane. *L. pyrivorella* Bankes: Seapoint, common. Not previously recorded from Ireland. *L. mespilella* Hb.: Seapoint, common. Not previously recorded from Ireland. Both this and the previous species I have bred from larvae on apple. *L. salicivolella* Sirc.: Newcastle marsh, co. Wicklow; Cahirnane. *L. spinolella* Dup.: Glen o' Downs, very common; Park, Wexford. Muckross and Cahirnane. Not previously recorded from Ireland. *L. ulmifoliella* Hb.: Cahirnane. *L. nigrescentella* Logan (*breniella* Frey.): Seapoint. Recorded from the Wicklow Mts. (Kane). *L. trifasciella* Hw.: Glen o' Downs, Killoughrum forest. *L. kleemannella* Fb.: Kilmacanogue marsh, co. Wicklow. Recorded (one) from this locality (Cusack). *L. corylifoliella* Hw.: Glen o' Downs. *Acrocerops brongniardella* Fb.: Seapoint; Glen o' Downs; Cahirnane. *Ornix guttea* Hw.: Seapoint, common; Flesk, Killarney. *O. scoticella* Stt.: Glen o' Downs, very common; Cahirnane and Kenmare demesne, Killarney. Recorded from Enniskillen (Kane). *Gracilaria syringella* Fb.: cos. Dublin, Wicklow and Wexford; Killarney district; Kilkee Park and Carton, co. Kildare; Ballygluney and Tuam, co. Galway. *G. cuculipennella* Hb.: Kenmare demesne and Cahirnane, Killarney. Recorded from Sligo (Kane). *G. sulphurella* Hw.: Seapoint; Glen o' Downs and Enniskerry; Killoughrum forest; Kilkee Park, co. Kildare; Killarney district. A form with brownish-ochreous forewings at Seapoint, Kilkee Park, Killarney and Enniskerry. *G. tringipennella* Z.: Seapoint, common; Flesk, Killarney. *G. populetorum* Z.: The Quill, co. Wicklow. Recorded (one) from this locality (Cusack). *G. elongella* L.: Kilmacanogue marsh, Greystones and Glen o' Downs; Seapoint; Muckross, Kenmare demesne, Cloghereen and Cahirnane, Killarney. *G. alchimella* Scop.: Glen o' Downs, abundant; Muckross; Killoughrum forest

and Killurin, co. Wexford. *G. stigmatella* Fb.: Cahirnane, Killarney.

Epermeniadae.—*Cataplectica fulvigutella* Z.: Cloghereen, Killarney. Recorded from Dublin (Kane). *Epermenia chaerophylla* Göze; Seapoint; Powerscourt and Greystones.

Plutellidae.—*Cerostoma xylostella* L.: Seapoint; Glen o' Downs; Killarney. *C. nemorella* L.: Newcastle marsh, co. Wicklow; Cahirnane, Killarney. Recorded from Sligo (Kane). *C. costella* Fb.: Glen o' Downs; Killarney, common. *C. radiatella* Dn.: co. Wicklow; Killarney; Kilkee Park, co. Kildare, common. *C. vittella* L.; Seapoint; Muckross; Kilkee Park. *Plutella porrectella* L.: Seapoint, abundant. *P. maculipennis* Curt.: Seapoint and Glenageary; Kilmacanogue marsh; Curracloe, co. Wexford. *Acrolepia granitella* Tr.: Glen o' Downs, common, Powerscourt and the Quill.

Lyonetiadae.—*Opostega salaciella* Tr.: Cahirnane, Killarney. Not previously recorded from Ireland. *O. crepusculella* Z.: Cahirnane, common, and Muckross. *Leucoptera laburnella* Stt.: Abundant where it occurs; co. Dublin; Bray, co. Wicklow; Kilkee Park, co. Kildare; Muckross, Killarney. *L. spartifoliella* Hb.: Greystones, co. Wicklow. *Lyonetia clerckella* Hb.: Very common where it occurs; Seapoint, Blackrock, Milltown and Rathmines, co. Dublin; Glen o' Downs, Powerscourt and the Quill; Park and Killurin, co. Wexford; Killarney district. *Tischeria complanella* Hb.: Glen o' Downs and the Quill. *T. marginata* Hw.: Seapoint; Glen o' Downs.

Tineidae.—*Monopis rusticella* Hb.: Seapoint and Sandymount, co. Dublin; Glen o' Downs. *M. ferruginella* Hb.: Seapoint; Kilmacanogue marsh. *Meessia argentimaculella* Stt.: Kenmare demesne, near Lough Crincaun and upper lake, Killarney. Not previously recorded from Ireland. *Tinea cloacella* Hw.: Seapoint; Glen o' Downs; Park, Wexford; Cahirnane, Cloghereen and Muckross, Killarney. *T. musella* Z.: Flesk, Killarney. *T. pellionella* L.: Generally common. *T. pallacentella* Stt.: Seapoint, common; Kilmacanogue marsh. *T. lapella* Hb.: Seapoint, common. *T. semifulvella* Hw.: Seapoint, common; Park, Wexford; Kilmacanogue marsh. *Ochsenheimeria birdella* Curt.: Seapoint. *O. bisonella* Z.; Curracloe, co. Wexford; Seapoint. Not previously recorded from Ireland.

Lamproniadae.—*Phyllopora bistrigella* Hw.: The Quill and Newcastle marsh, co. Wicklow; upper lake, Killarney. Not previously recorded from Ireland. *Incurvaria pectinea* Hw.: The Quill, Enniskerry and Devil's Glen, co. Wicklow. *I. muscallella* Fb.: The Quill and Enniskerry. *Lampronia rubiella* Bjerk.: Seapoint and Rathmines, co. Dublin, common. *L. oehlmanniella* Tr.:

Cloghereen and Muckcross, Killarney. Not previously recorded from Ireland. *L. luzella* Hb.: Glen o' Downs. *Mnesipatris filicivora* Meyr. (*Entom.*, 1937, 70 : 194). The following are some additional localities: Sandymount, Dun Laoghaire, Sandycove, Killiney, Foxrock, Glenageary and Shankill. Mr. E. O'Mahony sent me larvae from St. Ann's, Clontarf. With the exception of Clontarf all these localities are in the southern half of co. Dublin. Shankill is about two miles from the Wicklow border; Clontarf is on the north side of Dublin Bay. Mr. F. N. Pierce, who has since studied the genitalia of this species, places it among the *Tineidae* in the genus *Teichobia* H.-S. The larva of the one other species of *Teichobia*, *T. verhuellevella* Stt., feeds on the fructifications of ferns, as does the larva of *filicivora*.

Adelidae.—*Nemotois minimella* Z.: Cahirnane, common, and Muckcross, Killarney; Newcastle marsh, co. Wicklow. Not previously recorded from Ireland. *Adela viridella* Scop.: The Quill and Glen o' Downs. *Nemophora swammerdamella* L.: Devil's Glen and Glen o' Downs. *N. schwarzella* Z.: The Quill, Kilruddery and Glen o' Downs.

NEPTICULINA.

Nepticulidae.—*Nepticula anomalella* Goze: Seapoint; the Quill (?). Recorded from Howth (Kane). *N. aurella* Stt.: Kilmacanogue marsh, Devil's Glen and Glen o' Downs; Muckcross; Park, Wexford. *N. sorbi* Stt.: Glen o' Downs (?) and the Quill. Not previously recorded from Ireland. *N. subbimaculella* Hw.: Glen o' Downs and Kilruddery, co. Wicklow, abundant; Carton, co. Kildare. Not previously recorded from Ireland. *Trifurcula immundella* Z.: Muckcross, Killarney. Not previously recorded from Ireland. *Scoliaula quadrimaculella* Boh.: Kilmacanogue marsh, co. Wicklow, three; Kenmare demesne, Killarney, one. Not previously recorded from Ireland.

MICROPTERYGINA.

Micropterygidae.—*Eriocrania sparmannella* Bosc.: The Quill. Recorded from Enniskillen (Kane). *Mneumonica subpurpurella* Hw.: Glen o' Downs, the Quill, Powerscourt and Devil's Glen, very common. *Micropteryx aureatella* Scop.: Glen o' Downs. *M. aruncella* Scop.: The Quill, Kilruddery and Glen o' Downs; Park, Wexford. *M. calthella* P.: Glen o' Downs, abundant, Kilmacanogue marsh, the Quill and Kilruddery; Carton, co. Kildare; Seapoint.

REFERENCES.

- BARRETT.—*The Lepidoptera of the British Isles*.
 "Clare I. Survey," *Proc. R. I. Acad.*, 31.

CUSACK.—“*Lepidoptera Collected in Ireland by Lieut. R. E. Cusack*.”—J. N. Halbert, *Irish Nat.*, 1919, 28 : 57.

KANE.—*Catalogue of the Lepidoptera of Ireland.*

LUCAS (MRS.).—“*Microlepidoptera Records in S. and S.W. Ireland*,” *Irish Nat. Journ.*, 1936, 6 : 147.

WILKINSON.—*British Tortrices.*

Correction.—p. 229, l. 31, for *arcuella* read *arenella*

4, Tobernea Terrace,
Monkstown, co. Dublin,
Ireland ;
December, 1937.

COLIAS HYALE IN THE NEW FOREST.--When I was out walking a Pale Clouded Yellow (*Colias hyale*) overtook and flew slowly by me, which enabled me to see it was a fine female in good condition, on June 19th, in the New Forest at Brockenhurst.—ERNEST E. JOHNSON ; The Evergreens, Lyndhurst, Hants.

ACHERONTIA ATROPOS IN OXFORDSHIRE.-A friend asked me yesterday to look at a caterpillar, which proved to be a Death's Head, which was picked up on grass last Friday about 6 feet from a hedge. I placed it in a flower-pot with soil and it straightway started burying and was soon underground. I couldn't resist visiting the spot where it was found, and in the hedge close by was a miserable-looking plant of woody nightshade, and on this was a very fine caterpillar of the green type, which I now have feeding at home.--FRED BURBIDGE ; 7, Market Street, Chipping Norton, Oxon, August 15th, 1938.

LAMPIDES BOETICUS IN THE NEW FOREST In the New Forest on October 1st I saw what I took to be a male *Polyommatus icarus* flying over the heather. (This confirms the statement in Frohawk that *boeticus* looks like *icarus* when on the wing.) The insect settled and closed its wings, and I saw at once that it was not *icarus*. The underside reminded me of that of *Thecla quercus*, and for a few moments I thought it might be a belated specimen of that species. But as soon as it took to flight again I realized that it must be one of the Blues, and when next it settled I saw the tails. Many desperately anxious minutes followed, for I had no net with me. *Boeticus* kept settling, but was very restless, and once when it flew up and circled round some trees in the manner of a Hairstreak, I thought I had seen the last of it. However, it came down again and pitched on a very low-growing plant of heather. Calling to one of my friends, who, not being entomologists, were watching me with amused interest, to fetch a nest of boxes from the car, I approached the insect very cautiously. It remained quite still, and I dropped my cap over it, schoolboy fashion. I was painfully aware that the work was only half done, and when the boxes arrived I began to lift the edge of my cap very gingerly. In a few moments *boeticus* was seen crawling among the stems of heather. I had no difficulty in getting it into the box, and my suspense was over. Despite the crude method of capture, the insect fortunately was not damaged.—H. SYMES ; The Watersplash Hotel, Brockenhurst, Hants.

ON THE TYPES OF *ADELPHA* (LEP., NYMPHALIDAE) IN THE COLLECTION OF THE BRITISH MUSEUM.

By ARTHUR HALL, F.R.E.S.

(Continued from p. 235.)

A. naxia Feld.

The type of *mucia* Fruhst., is only an aberrant specimen of *epiphicla* with unusually narrow white bands. *diatrete* Fruhst. is synonym to *naxia*, but *zynia* Fruhst. from Matto Grosso is a good subspecies and *hieronica* Fruhst. from Trinidad is also a good race.

A. ixia Feld.

So far as I can make out *ixia* Feld., *messana* Feld., *fundania* Fruhst., and possibly also *aufidia* Fruhst., are individual forms of one rather variable race. The presence or absence of a third yellow subapical spot on the fore wings is a character of not even sub-specific value; the presence of a fifth spot of the yellow subcostal patch, in cellule 3, is, however, characteristic of the species and is absent in only one example in the Museum series of 43 specimens. More rarely a small yellow spot is present in cellule 2.

The type of *leucas* Fruhst. is a female from Mexico and the name may stand for the scarcely different Central American race. Although the type of *canuleia* Fruhst. was described as being in the Frustorfer Collection this name was not in the collection at all when it came to the Museum, the only specimen from Tarapoto being the type of *pseudomessana* Fruhst. which is a good subspecies, but hardly has the aspect of a different species.

A. abia Hew.

A. rufilia Fruhst. is synonym to *abia* Hew., but the *abia* of Frustorfer in Seitz is a different and much commoner species, which may be known by the MS. name under which some of the Frustorfer specimens stood:

A. mincia sp. nov.

♂. Upperside as in *A. abia* Hew. but the hind wings much less produced anally, more rounded. Underside at once distinguishable by the pale area indicating the yellow patch of the fore wings being placed distal to the white band instead of immediately above it and being intersected by much broader and more yellowish lunules; the other brown lines are also broader, but not so sharply defined—those on the hind wings formed of more lunate

spots. In the female the markings of the underside are more suffused and indistinct. In the British Museum from Goyaz, Bahia, Minas Geraes, Rio de Janeiro, São Paulo, Santa Catharina, Parana, Rio Grande do Sul, Paraguay (types) and N.W. Argentina. Also in my own collection from Parana and Novo Friburgo.

A. epizygis Fruhst.

This is a good species, but *epona* Fruhst., of which only the type specimen is known, is a scarcely different form and may be synonymous.

A. gavina Fruhst. and *A. calliphane* Fruhst. are good species belonging to this group. Another closely allied undescribed species may be called :

A. poltius sp. nov.

♂. Nearest to *A. calliphane* Fruhst., but differing from it and from all closely allied species in the more uniform width of the yellow band of fore wings, in which the spots in 2 and 3 are almost as wide as those in 4 and 5. The underside resembles *A. calliphane* in the white band of fore wings being continued to the costa, but the pale area indicating the yellow patch of the upperside is without the whitish spots on its proximal edge, and on the hind wings the dark brown discal line is distinctly macular. Type and 2 other males from Minas Geraes and one male from Rio Janeiro in the British Museum ; one male from Barbacena, Minas Geraes in Coll. Hall.

A. falcipennis Fruhst.

A. perga Fruhst. is a pure synonym, the only difference between the types being that one is a fresher specimen than the other.

A. pithys Bates.

No specimen of *vodena* Fruhst., described from Mexico, was in the Fruhstorfer Collection, nor is there any Mexican specimen in the British Museum.

A. rothschildi Fruhst.

A. pallida Rüb. is a synonym.

A. attica Feld.

A. leobia Stgr., *orinoco* Weeks, *carmela* Fruhst. and *serita* Fruhst. are all synonyms. Specimens in which the band of the hind wings is dark yellow as far as the upper radial occur in Colombia in company with typical *attica*, but have no separate name.

A. arete Mén.

A. cibyra Fruhst. appears from the description to be the normal male and therefore a synonym. The type of *pseudarete* Fruhst. has the band of the fore wings white up to vein 3 with yellow scaling distal to it, but in most specimens of this form the band is white only to vein 2, often without yellow scaling. It seems to be a dimorphic individual form, being in the British Museum from Espiritu Santo, Paraguay, and one specimen labelled "Para".

A. deborah Weeks.

The type of this very distinct species was originally labelled "Bogota", but this has been scratched out and "Bolivia" substituted. As the five other specimens in the Museum and two in my own collection are all from Colombia it seems probable that "Bolivia", the locality given by Weeks, is an error.

(To be continued.)

NOTES AND OBSERVATIONS.

GYNANDROUS PLEBEIUS ARGUS.—On August 6th I took, in the New Forest, a gynandrous specimen of *P. argus* (Silver-studded Blue), being complete male on the left side and female on the other.—E. E. JOHNSON; The Evergreens, Lyndhurst, Hants.

EUCHLOË CARDAMINES IN AUGUST.—Respecting Mr. Cruttwell's note in the *Entomologist*, p. 235, it may interest him to know that *E. cardamines* sometimes appears on the wing in August, as stated on p. 316 in my book (*The Complete Book of British Butterflies*): "Occasionally specimens occur in August and even as late as September; these probably are representatives of a second brood."—F. W. FROHAWK; October, 1938.

RAPID BREEDING OF COLIAS CROCEUS.—On August 26th, while on holiday at Portland Bill, I took a female *Colias croceus* var. *pallida*. Arriving home on August 28th I placed her on a pot of growing clover, upon which she commenced to lay ova as follows: August 28th, 34; 29th, 45; 30th, 48; 31st, 12; September 1st, 9; total, 148. The first larva was noticed on September 6th, when the temperature of the shed in which they were all reared was 62°. When they were five days old, noticing they were feeding very slowly I brought the temperature up to between 82°–87°, dropping to 65° during the night. This had a great effect on them, so much so that

they fed night and day ; a fresh pot of clover put in at night was completely gone by the morning, necessitating another being put in for the daytime. The first larva pupated on September 20th, exactly fourteen days after emergence. The last two batches of ova did not hatch, owing to being not fertile, lending support to my belief that with butterflies copulation takes place once or twice. The first imago emerged on September 28th and the last on October 8th. In all 101 imagines were bred. Results as follows : ♂, 54 ; ♀, typical, 25 ; ♀, var. *pallida*, 22. The whole time taken from the first ova laid until the first imago was thirty-one days.—H. L. DOLTON ; 36, Chester Street, Reading.

CETHOSIA CYANEA DRURY : A JUNGLE TRAGEDY.—And how many thousand like tragedies are forever being enacted in these tropical jungles, but this one happened to come under my immediate notice. I had always been especially desirous of breeding some species of the beautiful *Cethosia* butterflies, and though I had been informed that their larvae fed on *Passiflora*, I had never had any reason to verify this statement ; rather the reverse, for though I had frequently watched the females of several species of this genus searching to find a plant to lay on, where *Passiflora* was certainly not absent, I had hitherto met with nothing but disappointment. But this morning I was at last delighted to see that a female of *Cethosia cyanea* Drury had evidently found the plant she needed ; however, for about twenty minutes I waited and watched in vain, which under the full glare of the mid-day tropical sun (with a shade temperature well over 90°) was beginning to be a little irksome ; so after having observed many futile attempts at ovipositing, I decided to leave her busy, hoping to find some ova there on my way back later on. In the meantime, having now discovered the food-plant favoured by the *Cethosia*, it was not long before my " boy ", Huong, found a batch of 27 ova on the same species of plant not half a kilometre away, which I judged (and that rightly) were the eggs of *Cethosia* ; they were laid in close formation all round one of the juicy stems. This rather detracted from the satisfaction of finding later on, when returning to the original spot, that there too, sure enough, were 3 nice eggs laid on the upperside of one of the more tender leaves, and the butterfly was apparently gone. But alas ! the tragic event that had taken place was that when she had at last found a suitable leaf, and really started to lay her batch of eggs, she had been ruthlessly seized by red ants, which, having dragged her about 2 ft. away, were now discovered by Huong, greedily engaged in devouring the corpse of the poor little *Cethosia* butterfly, who had only that morning been so busy and happy laying her eggs. She was quite dead, so I promptly meted out capital punishment to all the ants I could get hold of, though I fear a good many escaped. The three ova had not been touched, but would no doubt have met with a similar fate to their parent had I not secured them. The plant was one of those luscious creepers so abundant in tropical forests, which I have subsequently

had identified as a *Passiflora*; from which I can only conclude that by no means all of that rather large genus of plants are equally acceptable to *Cethosia* butterflies.—M. E. FOUNTAINE, F.R.E.S.; Tuyên-Quang (Tonkin), Indo-China, June 23rd, 1938.

RESTING HABIT OF *HYLOICUS PINASTRI*.—There is no doubt that *H. pinastri* frequently rests high up on pine trees. Some years ago I was in Dorset with Dr. Lowther. Before my arrival he and Mrs. Lowther had taken two or three on the trunks low down. One day when we were searching we came across a gipsy who said that he knew the insect and that it was not much good searching low down, and that he was used to seeing them high up. That evening he brought us five which he had taken by climbing. Unfortunately they were all in one box and useless as cabinet specimens. One female laid a lot of ova, from which Dr. Lowther bred a good series.—G. V. BULL; Sandhurst, Kent.

A PINE HAWK IN THE NEW FOREST.—On August 5th I took a male *Hyloricus pinastri* at light in the Rhinefield Enclosure. This may be an indication that the insect is extending its range.—A. M. MORLEY; 9, Radnor Park West, Folkestone

LEUCANIA UNIPUNCTA IN S. WALES.—While sugaring with Dr. C. G. M. de Worms in a Glamorganshire wood some fifteen miles from the coast on October 15th last I was very surprised to take, at 9 p.m., a fresh female of *Leucania unipuncta*. There appear to be only two or three previous records from S. Wales.—AUSTIN RICHARDSON; Beaudesert Park, Minchinhampton, Glos.

LEUCANIA UNIPUNCTA IN S.W. KENT.—I was fortunate enough to take a specimen of this immigrant at sugar on Romney Marsh on September 30th. It was in fairly fresh condition, but one forewing was badly chipped. —A. M. MORLEY; 9, Radnor Park West, Folkestone, October 5th, 1938.

NONAGRIA SPARGANII INLAND IN KENT. —While collecting moths round the gas-lamps in Ashford on September 21st, 1938, I was extremely surprised to capture a somewhat worn specimen of this Wainscot which is new to the district, as its nearest known habitat is at least twenty miles away, on the south coast. Its presence inland is of interest, as this insect is usually regarded as a maritime species.—C. G. M. DE WORMS; Milton Park, Egham.

CARADRINA EXIGUA IN SURREY AND AT WICKEN, 1938.—Among several places in which I have seen this species during 1938, two seem to be of interest. On September 23rd a fresh male came to light here, while on the 24th Mr. J. O. T. Howard took two more on the lamps here; and at 2.30 a.m. on the morning of August 2nd a male came to light at Wicken Fen.—A. J. L. BOWES; Charterhouse, Godalming.

CARADRINA EXIGUA NEAR GUILDFORD.—Ten *Caradrina exigua* were captured at light in my garden here on September 24th. The number of records this year lends support to the suggestion made in the October *Entomologist* that this insect has succeeded in breeding here. If not there would appear to have been a very remarkable migration.—E. S. A. BAYNES; Monkshatch Cottage, Compton, Guildford, October 14th, 1938.

MELLINIA GILVAGO AND CIRRHODIA XERAMPHELINA AT DUNGENESS.—On September 12th, 1938, I took on sugared posts along the shingle three specimens of *M. gilvago*, and two days later I was still more surprised to secure an example of *C. xerampelina* in the same area. The nearest wych elm or ash is several miles inland. It would seem that the north-easterly gales during the previous week might account for the presence of these two unexpected species in this locality.—C. G. M. DE WORMS; Milton Park, Egham.

LATE APPEARANCE OF TRIPHAENA FIMBRIA LINN.—A slightly worn specimen of this moth came to sugar on the evening of September 19th of this year at Parley, Dorset. *Graphiphora promuba* Linn. and *G. comes* Hubn. are both common here in the autumn, but I have never seen *fimbria* later than the end of July.—S. C. S. BROWN.

SUFFOLK MOTHS.—I have taken the following moths at Iken, East Suffolk, during late July and August this year. The locality, which is within the area of the Pliocene crags, consists largely of heaths and river marshes. *Palimpsestis octogessima*: One at sugar on the heath, July 26th. *Lithosia griseola* var. *flava*: Several beaten, the type being abundant. *L. complana*: Especially common at privet. *Noctua stigmatica*: Common from August 5th onwards, at sugar and flowers. *N. dahlia*: Two at sugar in a large wood, August 6th. *Coenobia rufa*: Several on rush stems (but not feeding) in some marshy fields. *Leucania albipuncta*: About five on grass heads by a salt marsh, the first on August 9th, and one at sugar on a pine. *Laphygma exigua*: Four specimens, the first at light on August 1st, the others later on grasses and rush. *Laspeyria flexula*: One beaten from bramble, July 27th. *Acidalia rubiginata*: Three at light on August 5th, 12th and 28th. *Coremia quadrifasciaria*: Very common in one wood.—C. GARRETT JONES; 4, Hazlewood Court, S.W. 4.

[*Laphygma exigua* seems to be a new county record, but the absence of an index to the list published last year by the Suffolk Naturalists' Society makes reference, in view of the unusual sequence of the genera, somewhat uncertain.—ED.]

SCHIFFERMUELLERIA GRANDIS DESV. IN THE NEW FOREST.—While collecting after dark near the Burley Old Enclosure on May 25th of this year I took a fresh specimen of this great rarity at rest on the trunk of a dead beech tree.—S. C. S. BROWN.

FURTHER NOTES ON TYRIA JACOBÆAE.—The following note deals with the emergence date of *T. jacobæae* (see *Ent. Record*, 49 : 138), and also has some bearing on the subject of host selection raised recently by Charles Nicholson (*Entom.*, 71 : 207 ; see also my note, *Entom.*, 69 : 240). Of the latter subject an interesting summary of modern views is given by A. D. Imms in *Recent Advances in Entomology* (pp. 250–259).

Emergence date.—Last year in Suffolk I collected a quantity of larvae from ragwort, these all pupating by mid-July. Ragwort being unobtainable, they were given groundsel at home, but they would scarcely touch this food-plant. Some groundsel-feeding larvae collected at Preston, Weymouth, where ragwort is the commoner food-plant, pupated at the end of July. Locally, apparently fresh imagines were seen during the first few days of July, and larvae from them, collected when nearly full grown, pupated in late August. This year the eclosion dates of the above were noted carefully. All the pupae had been kept through the winter in a dry tin placed in a cool room, where they received little if any frost, all having identical treatment from October to May 15th, when they were placed in moist bulb-fibre (still indoors and protected from the sun). The Suffolk specimens emerged between May 15th and 28th, the five Weymouth survivors coming out May 17th to 22nd. The local pupae commenced hatching on June 11th (two), reaching a peak about June 23rd (four), the last making their appearance on July 1st (two), a total of thirty-three emergences. The first fresh wild specimen seen in this district was on June 22nd. Incidentally, at Betchworth, Surrey, on May 5th, I observed four specimens, the earliest I have yet noted the species on the wing.

Host selection.—On May 25th two mated Suffolk moths were released in the garden ; at the end of June a single ragwort plant, grown as food-plant for another species (untouched by *jacobæae* in other years), was stripped by larvae, which pupated in early July. On the groundsel newly-hatched larvae appeared in early July, these commencing to go down in the last week in August—some are even now feeding (September 16th). Assuming that the June larvae were from Suffolk parents, and the July ones Londoners, it would appear that the female, when egg-laying, is able to “smell” the food on which it itself fed, and to pass over its congeneric and equally palatable relative.

Conclusion.—From my own observations on other species, I very much doubt whether the four weeks' earlier emergence of the Suffolk and Dorset insects was due to the fact that they had pupated four to six weeks earlier. I am led to believe that emergence will take place a fixed short while after the mean temperature has passed a certain figure. If this is so, one therefore concludes that there is a distinct London “race”, which differs from its relatives not merely in choice of food, but also in time of appearance. The Weymouth date shows that the late emergence is not due to the physiological effect of groundsel as food-plant.

To end with, what is the origin of the fresh specimens occasionally seen as late as the first week of August, when full-grown larvae abound? Are these retarded emergences a late "race" or a second brood? Have any breeders ever had late summer emergences in captivity?—B. A. COOPER; 61, Okehampton Road, London, N.W.10.

RECENT LITERATURE.

The British Mosquitoes. By J. F. MARSHALL, C.B.E., M.A., F.R.C.S.
London: Trustees of the British Museum (Natural History).
1938. 8vo, pp. xii + 342, 20 plates, text-ill. Price 20s.

This fine monograph on a rather limited group of insects is excellently carried out and illustrated; it will appeal to a small group of experts, and does not provide a great deal that is of general interest.

It will be remembered that the British Museum published a *Handbook of British Mosquitoes* by Dr. W. D. Lang in 1920. The present work is not a second edition of that, but it is unmistakably its spiritual descendant. Lang's work stimulated interest in British mosquitoes and made it easy to study them; the result is that 20 species were recognized as British in 1920 and the number stands now at 29. Of the 9 new editions, 7 were previously known from other countries, and most of them are rather close to other British species. Their detection has been due to careful collecting and study of material. Among them the most remarkable is *Anopheles algeriensis*, discovered by Dr. F. W. Edwards biting man in considerable numbers in Norfolk in 1932. This species is generally regarded as Mediterranean, but it has recently been found also in North Germany. The other two new additions owe their recognition to finer systematics, and the fact that certain forms which can with difficulty be distinguished as adults show clear points of difference in the early stages.

One of the most remarkable things in the present book is the completeness of information about early stages. It is not only that the egg, larva and pupa are known for very nearly every species, but that the four separate larval instars are also described, figured and placed in keys. Nearly all of this work has been carried out by the author and his assistant Mr. Staley; it must have entailed an enormous amount of careful work in breeding and description. It would probably be true to say that there is no other group of insects in Britain or any other country of which the early stages have been so thoroughly described. More than a century of butterfly-chasing in this country has not led to any such increase in knowledge. This is disappointing, for the entomologist has the material all round him, and even if he worked in his own home and with simple apparatus he could carry out much useful work of this sort, and there are many other familiar groups at every one's door.—P. A. B.

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THE RHOPALOCERA OF THE ISLANDS OF RHUM, EIGG, MUCK, EILEAN NAN EACH AND HEISKER (INNER HEBRIDES), AND OF HARRIS, NORTH UIST, SOUTH UIST, ERISKAY, TARANSAY AND THE MONACH ISLANDS (OUTER HEBRIDES).

BY J. W. HESLOP HARRISON, D.Sc., F.R.S.

THIS year the task of accumulating further data for our County Flora of the Inner and Outer Hebrides was pursued more vigorously than ever, and this, of course, necessitated the exploration of many additional islands. During the progress of the work, as on previous occasions, advantage was taken of the opportunities presented to investigate the entomology of the areas visited.

In 1937 the expedition, for the first half of its labours, was based on the Isle of Soay, south of Skye, from which Rhum, Eigg, Canna and Sanday were worked. Later we once again returned to Raasay to complete our work there. This season, however, the Isle of Rhum formed our headquarters for three weeks, and from that island Canna, Sanday, Eigg and Heisker were visited. After leaving Rhum we transferred our activities to the Islands of South Uist, Eriskay and Fuday, where the flora, and incidentally the fauna, were subjected to close study, in each case with somewhat remarkable results.

In addition, at other periods of the year, further expeditions were dispatched to examine the Isles of Muck, Eilean nan Each and Eigg (Inner Islands), and Harris, North Uist, Baleshare, the Monach Islands and Taransay (Outer Islands). Here again the insects were studied as well as the plants.

The results for all, as far as the Rhopalocera are concerned, appear in the following paper, and they should be considered as the product of the joint energies of Dr. G. Heslop Harrison, Dr. W. A. Clark, Mr. W. Campion, Dr. A. Ritchie and myself.

Argynnis aglaia L.—Last year I was unable to report this insect from the Isle of Eigg, but ventured to prophesy that it would eventually be discovered there. In August, approaching the island from the east, and not from the west as in 1937, we observed the species flying in considerable numbers in the area between the pier and the Post Office, which lies in the centre of the island. All the females inspected proved to be quite typical. On Rhum the species swarmed everywhere from sea-level at Harris, Dibidil, Kilmorey, etc., to about 2000 ft., or even higher, on the slopes of Askival, Halival,

Orval, Fionchra and Scurr nan Gilleán, and once again, for the most part, the typical insect predominated. Only near Papadil, a lochan lying on the south-east of the island, did the var. *scotica* Watkins prevail. The specimens brought home were as dark as those from South Rona, whence the blackest we had seen previously were derived.

A. selene L.—Already recorded from Rhum in the September *Entomologist*. Since that note was written the insect has been found to be of general distribution in the island.

A. euphrosyne L.—A single very worn specimen was noted on the eastern slope of Halival at a height of about 700 ft. This species has not been reported previously for any of the Small Isles, although I have captured it myself at Arisaig on the mainland directly opposite.

Aglais urticae L.—To the islands, reported last year as producing this butterfly, may be added Harris, South Uist, North Uist, Eriskay, Muck, Eilean nan Each and Heisker. The occurrence on Heisker (Inner Islands) seems very remarkable, for that island is a mere reef, completely swept by the sea in winter, and possessing a very limited amount of vegetation. Amongst this, in the area adjoining the lighthouse is a patch of *Urtica urens*, and this supports the insect. The specimens were large and very dark, in that respect resembling those observed in South Uist. On the latter island examples were noted flying around the cairn on Beinn Mhor at an elevation of 2034 ft.

Eumenis semele L.—Abounding on Eriskay and Fudlay, but strangely enough seemingly absent from the dunes and “machair” on South Uist, which were carefully investigated on a long series of hot sunny days.

Maniola jurtina L.—Frequent everywhere, even on Taransay and the Monach Islands, where the species displayed very dark undersides; absent, however, from Heisker (Inner Isles).

Erebia aethiops Esp.—This is inserted simply to supply the information that, although Rhum was searched exhaustively in every direction for a period of no fewer than twenty sunny days, no further specimens were secured; that noted last season remains unique.

Coenonympha tullia Müll.—From the same islands as in earlier reports, with the addition of Harris, North Uist and Taransay. In every instance the pale *scotica* form alone came under observation.

C. pamphilus.—Muck, Harris, North Uist, South Uist and Eriskay may be added to last year's localities.

Callophrys rubi L.—In recording the results of last season's work, I reported that sweeping on Rhum had failed to reveal the presence of the Green Hairstreak. That statement held true for

the west side of the island. This year larvae were collected and swept from heather (*Calluna vulgaris*) on the lower zones of Askival and Halival.

Polyommatus icarus Rott.—Common enough ; to the former list of islands known to produce it may be added Heisker (Inner Isles), Harris, North and South Uist, Eriskay, Taransay, Monach Islands (Heisker,* Outer Islands). The extension of its recognized range to the Heisker reef, and to Taransay and the Monach Islands, lying to the west of the main series of the Outer Islands, deserves emphasis. Most of the females can be regarded as var. *caerulea* ; the males, in general, were very lightly marked on their lower sides. Moreover, the so-called var. *persica* was secured on all the islands just named, with the addition of Rhum.

Pieris napi L.—Common on the machair, and around the lower lochs on South Uist and Eriskay ; also captured on Muck and Eilean nan Each. In none of these cases did the form noted demand special comment.

P. rapae L.—A single example from Rhum, from which the species was not recorded in former publications.

P. brassicae L.—Captured on the wing in August on Rhum and South Uist ; in addition, pupae were brought home from Harris at Easter. The specimens taken in August were almost certainly the products of last year's pupae of delayed emergence, or themselves autumnal innigrants. Fortunately, before these examples were seen the cabbages on both islands had been subjected to close examination, and found to be quite untouched. As far as Rhum is concerned, this evidence demonstrates without the possibility of doubt that no larvae of this species had fed up there this season ; there is only one small patch of cabbages, and no other suitable food-plant grows on the island !

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NOMIADINES SEMIARGUS IN CORNWALL.—Four years ago I was fortunate enough to capture a butterfly, whose identification was for the time passed over as a common species. On revising the collection later, with more knowledge of the science, I was surprised to discover that this butterfly was a male of the species *Nomiades semiargus*. This specimen was captured at a sheltered cove near Fowey, S. Cornwall, about the middle of July.—R. W. HOLME ; School House, Sherborne, Dorset.

* It is important to note that the largest island of the Monach group is also called Heisker ; it should not be confused with the Inner Island Heisker. .

SOME OBSERVATIONS ON *SPHINX LIGUSTRI*.

BY L. G. HULLS, F.R.E.S.

DURING the summer of 1937 a pair of *Sphinx ligustri* were found on a telephone post, and from the subsequent eggs some sixty larvae were obtained. In due course fifty pupae resulted, and in June, 1938, fifty moths emerged. As far as could be ascertained seven pairs mated, with the result that over 300 larvae were obtained. The possession of such a number of larvae seemed to warrant a certain amount of observation and experiment, and, on this, the following notes are based.

Newly hatched larvae attracted by light.

The eggs were kept in a large glass Petri dish, and as the larvae hatched out, it was noticeable that they eventually congregated at a spot on the side of the dish nearest to the window of the room. The drawing of a thick green curtain over the window which allowed only the merest trace of light to enter the room had no effect on this. Larvae which hatched out during the night would always be found at this same spot on the dish, attracted by the extremely small amount of early morning light which had filtered through the drawn curtain. Larvae placed in the centre of a ring of about a dozen different leaves (including privet) would always set off in the direction of the source of light, and this applied equally to daylight and artificial light. There appeared to be no question of the larvae being attracted by their food-plant, for they would pass unconcernedly within half an inch of a privet leaf in an attempt to get nearer the light. Larvae placed on a filter-paper, the centre of which had been moistened with strong aqueous extract of privet showed no interest in it as they passed over it on their journey towards the light.

The food-plants of S. ligustri.

Attempts were made to feed the larvae on a large number of different wild and cultivated plants other than those commonly noted as food-plants of *S. ligustri*. With but one exception the larvae chose to die rather than eat the plants. The exception was a garden variety of honeysuckle (sometimes known as Japanese honeysuckle), which the larvae ate readily. A considerable number were reared successfully on this plant. A large number of different leaves were soaked in strong aqueous extract of privet, dried, and then offered to the larvae, which in every instance refused to eat

them. Ten newly hatched larvae were placed on lilac in a breeding-cage. Of these ten, five went on hunger strike and died of starvation. The other five eventually began to feed sparingly and were ultimately reared to maturity. They pupated eight days later than controls fed on privet, and, what is of particular interest, produced pupae larger and heavier than any others amongst the 225 obtained. It may be worth while to record these weights as compared with the average.

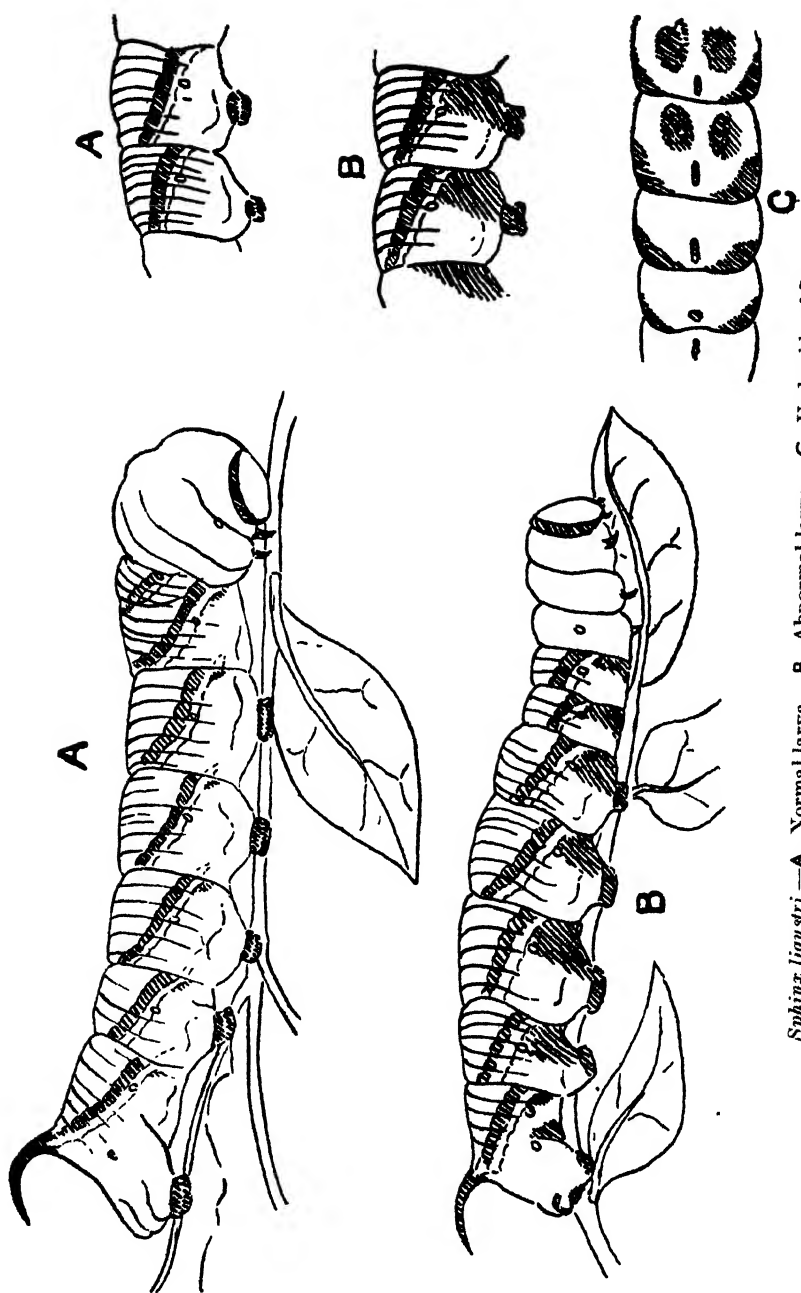
Lilac.	Privet	
(1) 4.66 grm.	(1) 3.15 grm.	} Chosen at random from a batch of 200 pupae.
(2) 4.37 „	(2) 3.87 „	
(3) 5.29 „	(3) 3.42 „	
(4) 4.68 „	(4) 3.53 „	
(5) 4.28 „	(5) 4.19 „	

Methylene-blue as a poison.

During the course of some previous experiments with the larvae of *Smerinthus populi*, it was found that if the leaves of the food-plant were dusted over with finely-powdered methylene-blue, the larvae soon became bright purplish blue in colour. Many larvae were reared completely on such a diet with no apparent ill-effects. Larvae of *S. ligustri* similarly fed are quickly poisoned, and after eating only a very small amount of the leaves they cease feeding and begin to shrivel up.

The effect of rearing larvae behind red glass.

A number of newly hatched larvae were put on privet in a breeding-cage glazed with the red glass used in photographic work. After about the third moult there appeared to be some deviation from the normal in so far as the markings were concerned, and, by the time the larvae were fully fed, there was no doubt that several of them were very abnormal. From the drawings (p. 270) accurately made of these larvae, it will be seen that there is a very considerable darkening at the base of each purple stripe, and that this is continued to the underside of the larva, where it forms a sort of sooty black pattern. It is of course possible that larvae reared normally sometimes develop these markings, but none was found in the rest of the batch of some 200. It is to be noted that not all the larvae reared behind red glass showed this deviation from the normal to the same extent, some hardly at all. It will be of great interest to see if there is any abnormality in the resultant moths. A similar experiment in which blue glass was used produced no observable effect on the larvae.

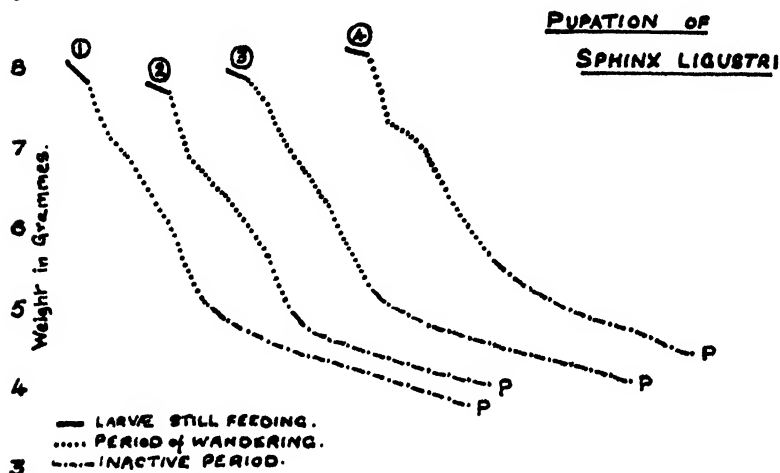


Sphinx ligustri—A. Normal larva. B. Abnormal larva. C. Underside of B.

The loss in weight which occurs during the change from larva to pupa.

It is, of course, very obvious that there is a great difference in weight between a fully-fed larva and that of the pupa it eventually produces. Actually it works out on an average that the pupa is very nearly half the weight of the fully-fed larva. With a view to discovering something of the manner of this loss in weight, a large number of larvae were weighed every twelve hours from the time they were of maximum weight until pupation occurred. One of the most interesting facts that this procedure yielded was that the drop in weight commences some considerable time before the larva

9



PERIODS of 12 HOURS (9.30AM - 9.30PM - 9.30AM)

ceases to feed. This seemed a little extraordinary, but repeat experiments with numbers of larvae only confirmed the fact. It is of interest to note that similar experiments with *Acherontia atropos* and *Chaerocampa elpenor* seem to point to the fact of this occurrence being normal amongst larvae.

From graphs drawn from the figures obtained it appears that there are three fairly distinct periods in the change from larva to pupa. First, a period of fairly sharp loss which occurs whilst the larva is still feeding. Second, a period of very sharp loss which represents the stage during which the larva is wandering about. In this period there is always a slight slowing up of loss with a subsequent sharp fall, and this is more marked in some cases than in others. The third period is that in which the larva ceases to wander, remains still and begins the process of shrinking. During this period the loss begins to slow down, and eventually tails off

to a slow and regular loss, until pupation occurs. Some of the actual weighings are recorded in the following table :

Table of Weights showing Loss during Pupation of S. ligustri.

Weights (in grammes) recorded every 12 hours.

No. 1.	No. 2.	No. 3.	No. 4.
8.09 .	7.80 .	7.98 .	8.23
7.83 .	7.70 .	7.85 .	8.17
7.19 .	6.84 .	7.53 .	7.32
6.89 .	6.60 .	7.01 .	7.18
6.48 .	6.34 .	6.64 .	6.90
6.08 .	6.00 .	6.27 .	6.36
5.46 .	5.63 .	5.72 .	6.00
5.03 .	4.97 .	5.27 .	5.65
4.82 .	4.73 .	5.01 .	5.40
4.70 .	4.59 .	4.88 .	5.21
4.57 .	4.52 .	4.76 .	5.09
4.48 .	4.42 .	4.69 .	4.96
4.39 .	4.35 .	4.60 .	4.85
4.32 .	4.27 .	4.53 .	4.77
4.23 .	4.20 .	4.46 .	4.69
4.16 .	4.13 .	4.39 .	4.59
4.08 .	4.07 .	4.32 .	4.49
4.00 .	4.01 .	4.26 .	4.39
3.92 .	.. .	4.20 .	..
3.84 .	.. .	4.13 .	..
3.75 .	.. .	4.06 .	..
Pupa 3.58 .	3.81 .	3.86 .	4.17

It is to be borne in mind that in these experiments the larva were not allowed to bury themselves to pupate, and, therefore, it is quite likely that results would be somewhat different under natural conditions.

Rax,

Chidham,

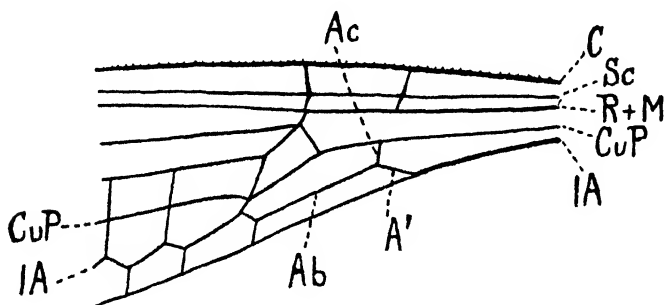
nr. Chichester,
Sussex.

OENEIS AELLO : APPARENT SECOND BROOD. —On October 5th this year I took quite a fresh specimen of *Oeneis aello* here at about 1600 metres on the way up to Shatzalp. I have heard of a second brood in the Engadine, but for Davos I understand that it has not been previously recorded. There have been about thirty species flying here during the past three weeks, and among these I have taken *Pyrgus serratulae* var. *caeca* and a fine variety of *Lysandra coridon*.—J. D. COWPER, F.R.E.S.; Fridericianum, Davos-Platz, Grisons, Switzerland.

A NOTE ON THE TILLYARDIAN NOTATION OF THE ANAL NERVE IN *ODONATA*.

BY LT.-COL. F. C. FRASER, I.M.S.

THERE appears to exist some ambiguity as to the portions of the anal nerve in Odonata to which Tillyard applied the notation *Ab* and *A'*. That this is so, is clear from the comparative table on notation given by Dr. Barnard (1937, *Ann. S. African Mus.*, **33** : 172). Here he gives the notation for the "Anal bridge" as "Tillyard, 1917, *Ab*, and Tillyard, 1926, *A'*". This synonymy is quite erroneous, but the error is one of Tillyard's and not of Dr. Barnard's. Dr. Tillyard cleared up this error in correspondence which I had with him on the subject in the latter part of 1928,



and it is explained, perhaps not very clearly, in his paper on the "Evolution of the Order Odonata" (1928, *Rec. Ind. Mus.*, **30** : 170).

In 1917 Tillyard named that portion of the anal nerve (IA) which extends from the cubital cross nerve *Ac* to the level of the distal end of the quadrilateral (discoidal cell) as the "anal bridge" and gave it the notation *Ab*. In 1926 (*Insects of Australia and New Zealand*) he substituted the notation *A'* for this without giving any reason for the change. Both in the text and in the text-figures throughout this work, the anal bridge is denoted as *A'*. This apparent synonymy arose from some confusion of thought: Tillyard had then elaborated his theory of a "secondary anal nerve", which was made up of the nerve *Ab* and its extension proximalwards to the posterior border of the wing. He had intended the notation *Ab* to stand and to apply the notation *A'* to the extension of *Ab*. Unfortunately he failed to make this clear, so that an apparently new notation for *Ab* appeared in the 1926 work.

In 1928 (*l. c.*) he had overlooked the synonymy of 1926 and reintroduced the notation *Ab*, but reserved it purely for the anal bridge and applied the notation *A'* for its proximal extension. My figure and a careful reading of the passage referred to in the *Records of the Indian Museum* should make this quite clear.

In a recent paper (1938, *Proc. Roy. ent. Soc. Lond.*, 13:60), I have been able to demonstrate that the anal nervure in the Odonata does not arise as a common stem with the cubitus (CuP) but has an independent origin from the base of the wing. In the Coenagriioidea it arises fused with the posterior border of the wing and leaves that structure as the nervure *A'* and is continued on as the nervure *Ab*. Thus in the future, the necessity to cut up the anal nervure into composite portions will rarely arise and so the confusion caused by the synonymy of the notation will be largely mitigated.

Bournemouth.

ISLE OF WIGHT AND THE SEVEN TOADS: A SUGARING EXPERIENCE.
—In the early part of July I spent a week in the Isle of Wight and sugared nightly on the cliffs near Freshwater. The fence selected for sugaring no longer served any other useful purpose; the posts reclined at unusual angles and much of the wire had gone. Some of the more recumbent posts were restored to an erect position and the sugar was applied low down on account of the strong wind. The sugar never attracted many moths, but those moths which did come proved to be a great attraction to the local toads. Three of these unbidden visitors were noticed on the second evening, and no less than seven arrived the following night. Numbers declined thereafter, but a few were always present on subsequent nights. Some were seen standing on their hind legs and trying to climb the posts in their efforts to bring the moths within range; one particularly daring individual had climbed up a sloping post to a height of nearly 18 in.; the majority, however, were content to sit at the base of a post and wait for the fall of an intoxicated moth. It has been suggested that the alcoholic ingredients of the sugaring mixture may have been the prime attraction. This theory is disproved by the action of the toads themselves; they would scarcely try to climb posts to reach that which already lay at their feet. Whence they came and how they summoned others to the feast must remain a mystery. Nevertheless, it seems clear that the collector is faced with a menace of a new order. Spiders and millipedes are notorious pirates at the sugar-patch, but the obvious and simple methods of dealing with them cannot, with propriety, be applied to toads.—BERNARD EMBRY; St. Bartholomew's Vicarage, Dover, Kent.

[We think Mr. Embry ought to get in touch with Walt Disney.—
Ed.]

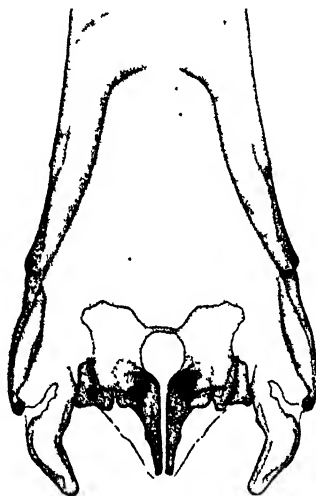
NEW GENERA AND SPECIES OF MALLOPHAGA.

BY THERESA CLAY, B.Sc., AND COL. R. MEINERTZHAGEN.

PHILOPTERIDAE Burmeister.

Philopterinae Harrison.**Falcoecus** gen. n.

THIS genus is distinguished from true *Philopterus* by the prolongation of the antennal and internal bands of the head to a point some distance beyond the anterior margin of the clypeal signature ; by the absence of a second trabecular tubercle and by the characters of the genitalia.

FIG 1—*Falcoecus aquilinus* ♂ genitalia. (R. S. Pitcher, del.).

Description of the Genus.—Head large with the following diagnostic characters : Internal and antennal bands terminating in a point some distance beyond the anterior margin of the clypeal signature ; hyaline anterior portion of head originates each side at the level of the clypeal suture ; clypeal signature large and distinct ; clypeal suture prolonged inwards on the dorsal surface each side, and passes down the median line of the head as a narrow suture to the level of the antennal fossae. Trabeculae large ; antennae filiform and similar in the two sexes. Abdomen short and rounded with tergal plates I-VII widely separated medianly in both sexes ; posterior margin of terminal segment rounded in the male and emarginate in the female. Genitalia characteristic (Fig. 1).

Genotype : *Philopterus aquilinus* (Denny).

This genus occurs on the following genera of Accipitres :

<i>Accipiter.</i>	<i>Circaetus.</i>	<i>Gymnogenys.</i>	<i>Rupornis.</i>
<i>Aquila.</i>	<i>Elanus.</i>	<i>Haliaeetus.</i>	<i>Stephanoaetus.</i>
<i>Buteo.</i>	<i>Haliastur.</i>	<i>Milvus.</i>	<i>Helicolestes.</i>
<i>Circus.</i>	<i>Pernis.</i>	<i>Harpagus.</i>	<i>Leucopternis.</i>
<i>Micrastur.</i>			

Helluo gen. n.

This genus is distinguished from *Falcoecus* by the characters of the pre-antennal region of the head and by the genitalia.

Description of the Genus.—Species with large heads and short broad abdomens. Head as shown in Fig. 2, with short ventral trabeculae scarcely projecting beyond the lateral margin of the head ; antennae filiform and similar in the two sexes. Abdomen short and broad with tergal plates widely separated medianly, and with numerous dorsal and ventral somewhat lanceolate hairs ; female abdomen with three small irregular-shaped dark chitinous plates in the centre of segment VII, one median flanked by a lateral plate each side. Terminal segment rounded posteriorly in the male and bilobed in the female. Genitalia extremely large in comparison with the size of the abdomen, and with characters as shown in Fig. 3.

Genotype : *Helluo neophron* sp. n.

This genus is apparently confined to the Aegypinae, and should contain the species *Philopterus brevicollis* (Nitzsch in Burmeister) from *Aegyptus monachus* as well as the genotype. An immature specimen (in the Meinertzhagen Collection) collected from a dried skin of *Gypaeus barbatus aureus* apparently belongs to this genus.

Helluo neophron sp. n. (Figs. 2 and 3.)

This species is distinguished from *H. brevicollis*, of which only Nitzsch's figure has been seen (*Ins. Epizoa*, 1874, pl. 10, fig. 7), by the shape of the head.

Description of the male. Head as shown in Fig. 2. Prothorax with rounded lateral margins each bearing a long hair at the widest point. Pterothorax with rounded lateral and posterior margins, the former bearing a long hair each side, and the latter with 2 postero-lateral hairs, 1 hair on the dorsal margin central to the acetabular bar each side, and 8 hairs along the centre of the dorsal posterior margin. Legs with claws unequal in size and bearing a number of pedunculate spines at the distal end of the tibia ; the second and third legs with a dark ring at the distal end of the femoral and tibial segments. Abdomen widest at the third segment with tergal plates 1-VII widely separated medianly. Spiracles open on clear spaces

in the tergal plates and become progressively more lateral in position from segments II-VII, those on segment VII and in some specimens

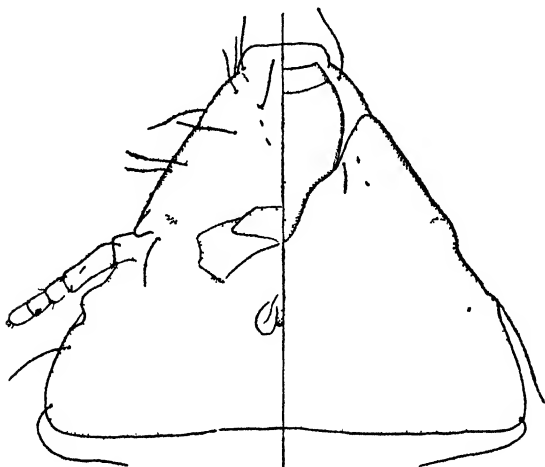


FIG. 2 — *Helluo neophion* ♂ head

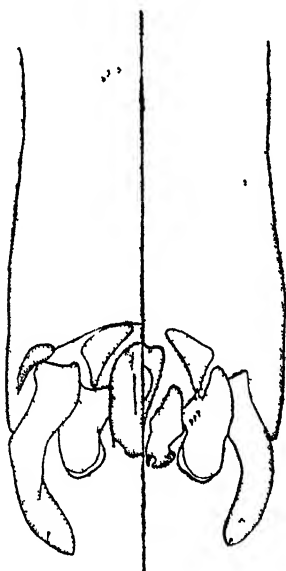


FIG. 3 — *Helluo neophion* ♂ gonitalia

those on segment VI actually opening on the lateral margin. Posterior margin of segment IX rounded and thickened. Segments with a row of dorsal and ventral hairs somewhat lanceolate in form, segments

III-VI with a lateral clump of 5-6 hairs on the ventral surface. Genitalia as shown in Fig. 3, with distal end of paramera appearing somewhat variable in shape.

Female.—Head and thorax as in the male. Abdomen somewhat more elongated than in the male, with tergal plates I-VII widely separated medianly; segment VII with three small ventral plates of irregular outline, one central and one lateral each side. Arrangement of hairs on segments I-VI similar to that of the male, but fewer in number. Valve with 19-20 long hairs at each postero-lateral corner and a group of 8-9 short spines on the posterior margin each side of the centre. Terminal segment with a lateral group of 5-6 hairs each side.

Material examined: 8 ♂♂, 8 ♀♀ from *Neophron p. percnopterus* from Egypt, and 8 ♂♂, 5 ♀♀ from *Neophron percnopterus ginginianus* from Sind.

Holotype: ♂ from *Neophron p. percnopterus*, slide no. 4829 (Meinertzhagen Collection).

Esthiopterinae Harrison.

Turnicola gen. n.

This genus is distinguished by the characters of the pre-antennal region of the head, especially by the presence of a vertical bar passing down the centre.

Description of the Genus.—Narrow elongate forms with the following diagnostic characters: Head elongated with rounded anterior margin and distinct clypeal suture prolonged inwards across the dorsal surface of the head as a narrow semi-lunar suture; a median bar passes down the centre of the pre-antennal region, the anterior origin of which is obscure; clypeal area large, and with internal bands curving towards each other anteriorly and fusing just posterior to the suture dividing off the semicircular anterior portion of the head. Antennal bands continued posteriorly and inwards across head as a faint semi-lunar band at the level of the pharyngeal sclerite; occipital bands distinct. Trabeculae small and pointed; antennae filiform and similar in the two sexes. Pterothorax short and diverging posteriorly. Abdomen narrow and elongated, with segment I short, and segment IX rounded posteriorly in the male and bilobed in the female. Pleurites narrow and distinct with re-entrant heads. Genitalia characteristic, with paramera sharply narrowed distally, flattened mesosomal plate and free penis.

Genotype: *Lipeurus angustissimus* Giebel.

This genus is apparently confined to the Turnices. *Lipeurus nigrolineatus* Piaget and *L. platyclypeatus* Piaget should be included with *L. angustissimus* in the genus.

Multicola gen. n.

This genus is unlike any described, and is recognized by its general form, structure of the head and genitalia.

Description of the Genus.—Stout elongated forms with the following diagnostic characters: Head with rounded or flattened hyaline anterior margin; clypeal suture distinct and prolonged inwards dorsally on each side to form a narrow and irregular suture, which is continued backwards along the median line of the head to a point just behind the posterior margin of the clypeal signature; trabeculae small; antennae filiform and similar in the two sexes. Thorax with lateral margins of both pro- and pterothorax flattened and diverging distally to a slight extent. Abdomen elongated, with segment I short and with nine segments in both sexes. Pleurites distinct, with elongated pointed re-entrant heads. Genitalia with short basal plate; paramera prolonged, pointed and somewhat curved distally; endomera straight, pointed terminally and shorter than the paramera; telomera small but distinct.

Genotype: *Esthiopterum hypoleucum* (Denny).

This genus, as far as is known to us, is confined to the avian genus *Caprimulgus*.

Fulicoffula gen. n.

This genus is distinguished by the characters of the head and of the terminal segments of the female abdomen.

Description of the Genus.—Elongated Esthiopterinae with the following diagnostic characters: Head with large clypeal signature bearing a median longitudinal slit and with a striated anterior margin; clypeal suture distinct and continued inwards across dorsal surface of the head and down the median line as a narrow suture as far as the anterior level of the mandibles. Trabeculae small and similar in the two sexes; antennae exhibiting sexual dimorphism. Pharyngeal sclerite greatly reduced or absent; gular plate large. Abdomen elongated, with segment IX bifid in the male and more deeply bifid in the female, and partly flanked each side by a pointed prolongation of segment VIII. Genitalia rather variable in form, but with paramera always broadened and unthickened distally, endomera flattened and mesosomal plate of variable and complicated form.

Genotype: *Esthiopterum luridum* (Denny).

This genus occurs, as far as we know, on the following genera of the Rallidae: *Fulica*, *Gallinula*, *Limnecorax*, *Rallus* and *Podica*. The following species are known to fall into this genus:

Degeeriella rallina (Denny).

Esthiopterum luridum (Denny).

Esthiopterum rotundatum (Piaget).

Esthiopterum comstocki (Kellogg and Chapman).

BEES FROM ST. VINCENT, BRITISH WEST INDIES.

By T. D. A. COCKERELL.

THE bees of St. Vincent were collected years ago by Herbert H. Smith, and fully reported on by Ashmead (*Trans. Ent. Soc. Lond.*, 1900, Part II, July). The collection was so nearly exhaustive that not much remains to be added, but a small collection made by Mr. and Mrs. J. Ogilvie during the first half of April, 1938, is sufficiently interesting to be worth recording. The species obtained are as follows :

Apis adansonii Latr. A single honey-bee, taken April 9th, agrees with the common African species. It has of course been introduced.

Xylocopa brasiliatorum (L.). One. Ashmead lists only *X. morio* Fabr. from St. Vincent.

Ceratina nigrita Ashmead. One, April 5th.

Triepeolus rufotegularis (Ashmead). Both sexes.

Coelioxys abdominalis Guérin. One.

Megachile barbadensis Cockerell. One male. New to St. Vincent.

Megachile binotata Guérin. This and the next are evidently common.

Megachile lanata Fabricius.

Augochlora piscatoria Cockerell. One.

Augochlora vincentana Cockerell. Common.

Halictus sancti-vincenti Ashmead. The Ogilvies obtained many specimens of both sexes on St. Vincent. I refer these here, as according to Ashmead this is the very common species on St. Vincent, but a female from the original lot, now before me, differs by the olive-green mesonotum, and the area of metathorax rounded (instead of truncate) behind, with the plicae, especially at sides, very distinct. A paratype of *H. plumbeus* Ashmead, also from San Vincent, is smaller, with blue mesonotum, and the dull area of metathorax so finely striate that it appears merely granular under a lens. The supraclypeal area is shining olive green. These specimens do not agree well with Ashmead's descriptions, and they certainly look different ; but the long series obtained by the Ogilvies shows some variation, though it has the mesonotum blue-green, and the area of metathorax appearing granular, and more or less evidently truncate. I can match a specimen exactly with one from Barbados, which I had identified as *H. sancti-vincenti*. Thus it comes to this : St. Vincent has either one very variable species of this group, or a series of closely allied species. The latter alternative would have to be demonstrated by additional materials, and especially field observations. In the meanwhile I refer the

Ogilvie specimens to *H. sancti-vincenti*, a name which Ashmead applied to the common species of the island. There are, in the British Museum, long series ascribed to *H. plumbeus* and *H. sancti-vincenti*. It would be desirable to designate a holotype for each species, and present more exact descriptions than those given by Ashmead.

***Exomalopsis ogilviei* sp. n.**

♀.—Length about 6.5 mm.; black, with the tarsi and hind tibiae dusky reddish, the scope of hind legs very pale reddish, brighter red on inner side of tarsi, a little dark brown hair on outer side of tibia just below knee-cap; head broad; sides of face covered with pure white hair; labrum and middle of mandibles dusky red; flagellum ferruginous beneath; hair of thorax scanty, white at sides and beneath, slightly fulvescent in region of scutellum; mesonotum strongly punctured; tegulae large, clear amber; wings hyaline, faintly dusky in apical region, stigma large, clear ferruginous, nervures brown; abdomen shining black, the second tergite with an oblique band of white hair on each side; third and fourth with entire white basal bands, fifth covered with pale, slightly yellowish hair, apex with pale reddish hair.

St. Vincent, B.W.I., April 9th, 1938 (*J. Ogilvie*).

This is doubtless the species which Ashmead recorded from St. Vincent as *E. rufitarsis* Smith, a species described from Jamaica. It might well be *E. rufitarsis*, so far as Smith's short description goes, but I examined Smith's type, and found that the stigma was dark brown. In the table by Friese (1899) it runs to *E. similis* Cresson (from Cuba), from which it is easily known by the large pale amber tegulae.

***Exomalopsis cyclura* sp. n.**

♂.—Length about 5 mm.; shining black, short and broad, with globose abdomen; sides of face with dense white hair; labrum and mandibles black; flagellum long, dusky reddish beneath; clypeus with very fine punctures; mesonotum and scutellum shining, but well punctured; hair of thorax mainly white, but some long black hair on scutellum; tegulae rather small, dark reddish; wings brownish, stigma dusky ferruginous, nervures brown; legs black, with the tarsi bright ferruginous, and the tibiae reddish at apex; middle basitarsi with very long pale hairs; hind tibiae and basitarsi with long black hair on outer side; abdomen polished, with white hair at base, and more or less interrupted bands on tergites 3 to 5, but no bands on second; apical plate bright ferruginous; base of second abdominal sternite broadly pale red.

St. Vincent, B.W.I., April 7th, 1938 (*J. Ogilvie*).

In the table by Friese it runs to *E. penelope* Ckll., which is larger and more robust, with different pubescence. It really closely resembles *E. iridipennis* Smith, which I have from Yucatan (*Gaumer*), but the pubescence and the colour of the legs are distinctive.

The common *Exomalopsis* on St. Vincent, as found by the Ogilvies, is *E. vincentana* Ckll.

Melissodes rufodentata Smith. Three females and many males. Smith describes the abdomen as being slightly metallic, which would suggest that he had *Florilagus lanierii* Guér. ; but he describes the fulvo-ochraceous pubescence of the upper side of thorax, which is distinctive. I cannot see any metallic colour, but have no doubt about the species. The female, not described by Smith, will be known by the rather small size (length about 10.5 mm.), broad head, black hair at sides of face, white hair on cheeks ; hair of thorax above bright ferruginous, with a little black on middle (mesothorax posteriorly and scutellum in front), tegulae bright ferruginous, wings dusky ; scope of hind legs large, plumose, light yellow, the hair on inner side of hind tarsi very bright ferruginous ; abdomen broad, black, tergites 2 to 4 with successively broader white hair-bands, that on 4 emarginate behind in middle ; hair at apex black ; sides in subapical region with long white hair beneath. In my key in *Trans. Amer. Ent. Soc.*, Jan., 1906, the female runs near *M. trifasciata* Cresson, which has fulvous bands on the abdomen. The red hair on thorax above is exactly as in *M. tapanica panamensis* Ckll., but the latter is larger, with fulvous bands on abdomen, and the flagellum bright red beneath (obscurely reddish in *M. rufodentata*). The male runs to *Florilagus lanierii*, except that the abdomen is without metallic tints. Also, the mandibles of male *M. rufodentata* have a very large yellow mark at base, which is wholly absent in all *Florilagus*. This feature is duly mentioned by Smith. Undoubtedly this is the species reported by Ashmead as *M. mimica* Cresson.

Melissodes trifasciatella Ashmead. Three females.

Centris barbadensis Cockerell, 1 ♀. April 12th. Described (1938) from Barbados.

Centris versicolor vincentana subsp. n. Two ♂, April 12th (*J. Ogilvie*).

♂.—Length about 13 mm. ; similar to *C. versicolor apicalis* (Guérin), from Cuba, but differing thus : hair of mesopleura not suffused with dusky ; wings longer ; tergites 1-4 bluish green, more brilliant and shining ; apical half of hind tibiae, and all of their basitarsi, with a long fringe of red hair posteriorly (in *apicalis* it is all black). The clypeus is very light yellow, with a broad black band down each side ; labrum all pale yellow, as also the short scape

beneath; a slender crescentic supraclypeal mark, and narrow lateral face-marks, not going above level of antennae; all the tibiae with a light mark at extreme base (lacking in *apicalis*).

It is impossible to be sure which particular form was the basis of *C. versicolor* (Fabricius), but it was probably not the present race. The species has been generally cited from the Greater Antilles but Ashmead recorded the present insect from St. Vincent as *C. versicolor*.

***Augochlora sanctula* sp. n.**

♀.—Length about or nearly 11 mm.; robust, rich purple-blue suffused with green, the clypeus shining green; hind margins of first three tergites narrowly black; femora, tibiae and tarsi brilliant blue, hind spur with many closely set minute spinules; the scanty hair of thorax above black; wings strongly dusky. This closely resembles *A. antillana* Ckll., but appears to be certainly distinct, being larger, with emerald green clypeus; mandibles (which are green at base) not very broad, not swollen below; flagellum black, the extreme apex red; area of metathorax very large, shining posteriorly, appearing dull and granular anteriorly under a lens, but the microscope shows fine striae, which are transverse in middle and oblique at sides; first recurrent nervure joining third cubital cell some distance from base; legs much more metallic. One specimen, April 6th (*J. Ogilvie*).

Superficially it looks like *A. lacustris* Ckll., from Florida, but it differs by the broader head and shining abdomen, and the sculpture of area of metathorax is quite different. The head beneath is emerald green, contrasting with the purple-blue of underside of thorax and abdomen.

ASSEMBLING OF MOTHS.—Some years ago I bred a quantity of *Lasiocampa quercus* and made some experiments with the females with regard to the means used to assemble the males. I found that when there was a steady breeze the males would enter the house in their quest. Further, I took a virgin female out in an open space and the males could be seen for quite 200 yards zigzagging up wind within prescribed parallels towards me. I took about two dozen of the males in roughly half an hour. None approached except those coming up wind. These tests were made on a Saturday afternoon, and on my return home I liberated the female and replaced the box in my inside breast pocket. After midday on the following Monday I was returning to business when a male *quercus* approached and, on holding my coat open, the moth scrambled into the pocket in search of the female which had been liberated two days previously. From these data it can only be deduced that the assembling is effected by means of scent alone, and that the female must emit a most powerful scent.—H. D. KENYON; 5, Carnsmerry Crescent, St. Austell, Cornwall.

ON THE TYPES OF *ADELPHA* (LEP., NYMPHALIDAE) IN THE COLLECTION OF THE BRITISH MUSEUM.

BY ARTHUR HALL, F.R.E.S.

(Concluded from p. 259.)

A. serpa Bois.

This is the oldest name amongst a large number of forms which are treated in Seitz as belonging to three different species but which are now known to be connected by intergrades, so that it is no longer possible to accord them specific rank. These intergrades are comparatively rare, so that in many localities two widely different forms are found, with only an occasional intermediate to give the clue to their relationship. Our data do not support the view that the two forms are seasonal, but there is some reason to suspect that in the Andean region the darker forms may be characteristic of higher altitudes.

A. s. celerio Bates is the typical form of the race from Central America extending also to Colombia and Peru, and of it *diademata* Fruhst. is a synonym. *massilia* Feld. is a slightly aberrant form like *celerio* above, but on the underside the outer white spots are not divided by dark rays. The type of *sentia* G. & S. is exactly like that of *massilia* except that the upper spot of the white band of fore wings is tinged with yellowish. The darkest Central American form is *godmani* Fruhst., the type of which is in the Tring Museum, and to this *syrna* Fruhst., based on Godman and Salvin's figures of *massilia*, is a pure synonym.

In Colombia *celerio* is accompanied by *aquillia* Fruhst., the darkest form of all, with very narrow white bands. Whether the striking *pione* G. & S. from Chiriqui, Colombia and Venezuela is really a form of the same species is not quite certain, but *egregia* Rüb. seems to be a very remarkable form of *pione* with obsolete white bands.

In Venezuela the light form resembling *celerio* has been called *phintias* Fruhst.; the dark form is *seriphia* Feld., the type of which is very similar to *aquillia* Fruhst., but with traces of a rufous post-discal band on the hind wings. As I have seen only females of *seriphia* and males of *aquillia* they may be sexes of the same form. The type of *duhae* Fruhst. from Ecuador is another dark form close to *aquillia* and *seriphia*. The type of *naryce* Fruhst. was not in the Fruhstorfer Collection, but a Peru female from the Joicey Collection seems to belong to *duhae*. The type of *diadochus* Fruhst. is hardly separable from *celerio*; that of *therasia* Fruhst. from Bolivia was also absent from the Fruhstorfer Collection.

In Guiana the species seems to be monomorphic and is represented by an unnamed form approaching typical *serpa*, but the fore wings have a rounded subapical patch, the hind wings are less produced and, on the underside, the white submarginal spots are narrower and often divided by dark rays. This form, which I call *timehri* form. nov., also occurs at Para.

Typical *serpa* Bois. is common in Central and South Brazil; *damon* Fruhst. is synonym to it and *ornamenta* Fruhst. an unimportant aberration. *hyas* Bois. from the same districts has the appearance of a distinct species but is connected with *serpa* by the intermediate forms *myrlea* Fruhst. (type from Espiritu Santo) and *radiata* Fruhst. type from Blumenau. An interesting new form from Peru may be called *viracocha* form. nov. This is nearest to *hyas* Bois., but the subapical patch of fore wings is smaller, more rounded and of a deeper rufous-orange tint and there are two distinct rufous spots in the cell; the underside is more like *radiata* Fruhst., but has the outer area of both wings more brownish. Described from one male (type) from Chanchamayo, male and female from Bolivia in the British Museum and one male from Chanchamayo in Coll. Hall.

A. paraena Bates.

The breeding experiments of the Rev. A. Miles Moss at Para have shown this species to be quite distinct from *A. serpa*. It is widely distributed, ranging from the Guianas throughout the whole of the Amazon to La Merced in Peru.

A. zea Hew.

A. tarpeia Fruhst. and *serpentina* Fruhst. are synonyms; the variation in the width of the white bands is individual, not local.

A. nea Hew.

The type of *campeida* Fruhst. agrees very closely with Hewitson's type of *nea* and is, therefore, synonym, both types are females.

I am unable to identify *A. zunilaces* Fruhst.; the description does not even say whether it has a band on the hind wings or not.

VICTORIA COUNTY HISTORY.—We have been asked to announce that a limited number of copies of the *Zoology of Cambridgeshire* (the greater part of which deals with the Insecta) are now available. They are reprinted from the *Victoria County History of Cambridgeshire and the Isle of Ely*, 1: 77–245, 1938. Applications, accompanied by a remittance of £1 1s., which covers postage, should be made to the Editor, Dr. A. D. Imms, Zoological Laboratory, Cambridge.

NOTES AND OBSERVATIONS.

PLUSIA INTERROGATIONIS: ITS OCCURRENCE IN DENMARK.—On July 26th, 1938, I caught one specimen of *P. interrogationis* ab. *flammiifera* Huene flying among *Chamaenerium angustifolium* (L.) Scop. in Bederslev Dale Wood, in the northern part of the island of Funen. It appears to be the only specimen caught in that island in 1938, and of especial value as a definite record of a very rare species. It is common knowledge that the caterpillar feeds on the moorland plant, *Vaccinium uliginosum* L. (bilberry); but it is open to doubt whether this plant grows at Bederslev. There are two possible explanations of the occurrence of this moth, which is regarded as a glacial relict. It may come from the extensive moorland about three miles from the locality where it was found, or it may be an immigrant from Sweden. Its known distribution is as follows: as an arcto-alpine species it occurs from the Arctic Ocean in the north, through Scandinavia to the central European mountains. It also occurs on moorlands in the north of England from Shropshire (with Radnor) and Staffordshire on the west and Lincolnshire on the east, through Scotland to Sutherland and in all suitable localities in Ireland. But investigation shows it is a very rare moth in the western parts of the Continent. In August, 1937, thirteen specimens of the species were taken by Director K. Groth in his garden at Svendborg. Mr. Groth recorded the circumstances of this capture in *Flora and Fauna* (1938). He called attention to the surprising occurrence of this moorland species at a locality distant about 6 miles from the nearest "original-biotope". It is of peculiar interest, therefore, to be able to record the insect from yet another locality. Further records may render it possible to see the main lines along which the solution is to be sought. No other specimens beyond those from Svendborg were taken in 1937. My Bederslev specimen gives support to the supposition of Mr. Groth, namely, that the species comes from the north-east, that is, from Sweden. I do not think there can be any other explanation of the facts. Earlier—years ago—the species was taken at Faaborg by Mr. N. L. Wolff, C. E. Copenhagen. Incidentally, it may be of interest to mention that the late German lepidopterologist Freiherr von Hoyningen (whose scientific pseudonym is Huene) gave the name "*flammiifera*" on account of the small flame rising above the centre of the "question mark".—OLAF BAGER; Odense, September 17th, 1938.

MISUSE OF CYANIDE.—It has frequently been reported to me that a certain type of collector, particularly the kind who is especially interested in obtaining aberrations of *Lycaenidae*, for example, is in the habit of collecting specimens "by the killing-bottle full". On inquiry it is usually stated that the insects are only stupefied and released after examination. Investigation of some of the resultant dumps of specimens, however, shows that by no means all the insects recover; and, if they do, the effect upon gravid females can hardly be beneficial. Even this course is a great improvement over that

followed by an individual who killed them all "so that they shouldn't get in the way again". Yet, is either course necessary? I no longer collect, but when I did I had no difficulty, as far as I can remember, in deciding whether I wanted a specimen or not while it was still in the net. One feels that the practice is the direct outcome of the craze for aberrations, and is particularly prevalent amongst those who value these in terms of money, and to whom they serve little purpose other than the gratification of their own cupidity. Nowadays, when the perfection of the internal combustion engine is rendering daily more difficult the task of preserving what is left of our natural heritage, it behoves every one of us to think very carefully whether we do good or ill whenever we collect. I very well remember a tale Mr. South used to tell about *Leptidea sinapis* in the New Forest. It used to be abundant there. Thinking that he would like a few for a correspondent, he went there to obtain some. After spending a whole day in fruitless search he ran across a collector, of whom he inquired whether he had seen any. "Oh, yes," he said, "a few, but I've just taken the last." It was literally true. From that day to this the species has never been seen again in the Forest. Not even the most abundant of such localized species can stand continued persecution, and to maintain that collecting these species has no effect upon their numbers is sheer nonsense. Do please collect carefully. Incidentally, the Committee for the Protection of British Lepidoptera is watching this matter closely.—N. D. RILEY.

THIRD BROOD OF *PIERIS RAPAE* (L.).—October of this year has been as remarkable for its weather as was March. Here, so far, there has been no frost, and on October 21st the temperature in a small unheated glasshouse, with the door wide open, rose to 80°. On that day a newly emerged *P. rapae* was flying about my kitchen garden. It was a male, and remarkable for the bright yellow of the underside of the hind wings, so much so that the yellow was very visible even when the insect was flying. At the time the butterfly was active the air was full of myriads of flies, gnats, and what appeared to be a small species of *Ephemera*.—B. TULLOCH (Brig.-General); Hill Court, Abergavenny.

SOCIETIES.

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—October 5th. 1938.—Mr. H. N. Michaelis, President, in the Chair.—Short reports on the two Field Meetings were given, the Delamere one having been the more successful, in spite of the bad weather. The bad season was much commented on, but this being Exhibition Evening, a good selection of choice and interesting insects was shown. The following members exhibited: W. Buckley, bred series of *Pieris brassicae* L. from Tenby, *Aglaia urticae* L. and *Diacrisia mendica* Cl. from North Wales, *Acronycta leporina* L. and *Melanchra pisi* L. from Chat Moss; J. E. Cope, Coleoptera from Colwyn Bay district, including *Broscus*

cephalotes L.; A. E. Tonge, *Sirex gigas* L. from Alderley Edge; B. H. Crabtree, a choice series of *Polyommatus icarus* Rott. from the West Coast of Ireland; R. Tait, bred series of *Acronycta menyanthidis* View. from Witherslack, *Notodonta dromedarius* L. and *Odontesia camelina* L., and one intermediate form of *Biston betularius* L., all from Chat Moss, from Wicken in August, *Catocala nupta* L., *Agrotis ypsilon* Rott., *Hadena leucostigma* Hb. and *Caradrina diffinis* L.; G. W. R. Bartindale, a good selection of Coleoptera, including the green form of *Carabus granulatus* L. from I.O.M.; C. H. Frost, bred *Deilephila elpenor* L. from Alderley Edge, and *Smerinthus ocellatus* L. taken at Bramhall; S. Gordon Smith, choice series of Lepidoptera showing variation in *Saturnia pavonia* L., *Arctia caja* L., *Gonodontis bidentata* Cl., *Callimorpha dominula* L., etc.; Dr. J. Hope, varieties of *Lysandra coridon* Poda, including ab. *fowleri*, from Swanage, August, 1938; H. N. Michaelis, *Crambus perlellus* Scop. from the Dee salt-marshes, and other Micros, also *Coenonympha tullia* Müll. and *Zygaena trifolii* Esp., both from Wales; L. Nathan, a bug, *Capsus ruber* Linn., not previously recorded for Lancs and Cheshire, and a bee, *Anthophora furcata* Panz., only once recorded for Lancs, both taken in a South Manchester allotment August 7th, 1938.--L. NATHAN, Asst. Hon. Secretary.

ENTOMOLOGICAL CLUB.—A meeting was held at the Burford Bridge Hotel, Boxhill, Surrey, on Tuesday, September 6th, 1938, Mr. W. Rait-Smith in the Chair. *Members present* in addition to the Chairman: Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin. *Visitors present*: Mr. H. M. Edelsten, Mr. F. W. Frohawk, Mr. W. J. Kaye, Rev. John Metcalfe, Capt. N. D. Riley, Mr. W. H. T. Tams. The company was invited to lunch, which was served at 1.15, after which Mr. Donisthorpe exhibited two flies which had been recently added to the British list, the one a large Asilid *Laphria gilva* L., first taken by Mrs. Blair on the occasion of the excursion of the South London Entomological Society to Windsor Forest; subsequently six more specimens were taken in the same place by Dr. Blair, the Rev. C. Tottenham and the exhibitor. The second was a pretty fly near *Chrysopilus loetus* Zett., probably new to science, as there is nothing like it in the British Museum collections. It was taken by the exhibitor as a pupa in the mud of a pond in Windsor Forest and subsequently successfully reared.

Mr. Collin, with regard to *Laphria gilva*, congratulated those who had captured this fine species in Britain, and added that it was by no means rare on the Continent; in Denmark Lundbeck had recorded it as very common where *Tomicus typographus* was abundant and that it preyed upon that beetle; it appears probable, therefore, that if a search were made it would be found in other localities in this country.

In the afternoon a walk over the summit of Boxhill was undertaken, and much enjoyed in spite of the slight misty rain. The easier journey downhill ended in tea at the hotel, and the party dispersed about 6 o'clock.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).

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